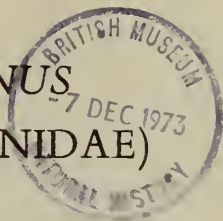


A REVISION OF THE GENUS *SILVANUS*
LATREILLE (S. L.) (COLEOPTERA : SILVANIDAE)



BY

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SYNOPSIS

Keys to, and descriptions of, seven genera and thirty-seven species are given. Three new genera are described and three are raised from subgeneric rank. Ten new species are described, ten new specific synonymies are made and lectotypes are designated where possible. Erroneous entries in the list of *Silvanus* in Junk's *Coleopterorum Catalogus* are listed and certain species are re-allocated to *Silvanolomus*, *Monanus*, *Silvanoprus* and *Oryzaephilus*.

I. INTRODUCTION

THIS is the first of a series of studies on the genera of Silvanidae which are associated with stored products. Members of the genus *Silvanus* (s. l.) are fairly regularly intercepted in small numbers on imports to Britain, particularly from the Oriental and Ethiopian regions.

The genus *Silvanus* was erected by Latreille (1804) for *Ips unidentata* Olivier, a species also known at that time as *Dermestes unidentatus* and attributed to Fabricius, who had placed *unidentata* of Olivier in *Dermestes* (Fabricius, 1792a). Later Latreille (1807) gave a detailed description of *Silvanus* and Sturm (1826) added *Dermestes bidentatus* Fabricius. Subsequently many species were described

in the genus, notably by Reitter and Grouvelle, and *Silvanus* became a repository for an assortment of unrelated species. Finally Grouvelle (1912) published *Notes sur les Silvanini* in which he endeavoured to bring order to the chaos. This important contribution contains descriptions and some keys and is the most recent on the classification of the subfamily Silvaninae. The genera described in the present study belong to this subfamily.

Hetschko (1930) catalogued the Silvanidae in Junk's *Coleopterorum Catalogus*, including 55 species in *Silvanus*, but his list contains a large number of erroneous entries. The following species are included both in *Silvanus*, the genus in which they were originally described, and in their correct genera: *albertesi* Grouvelle and *longicornis* Grouvelle (see *Monanus*, pp. 71-72); *abeillei* Guillebeau and *aridulus* Blackburn (see *Oryzaephilus*, p. 67); *latus* Fairmaire (see *Nausibius*, p. 73); *nubigena* Wollaston (see *Airaphilus*, p. 79); *orientalis* Grouvelle (see *Silvanoprus*, p. 64).

The species *angulicollis* Reitter is included in *Silvanus* but not in its correct genus, *Silvanops*, of which it is the type-species. '*Silvanus crenatulus* Blackburn' and '*Silvanus ornatulus* Blackburn' appear to be entirely cataloguer's errors as these names were not used in the paper referred to by Hetschko and a search through Lea (1912), which includes a list of the Coleoptera described by Blackburn, failed to reveal them. Apart from the above 10 errors there are 11 species in Hetschko which are either *species enquirendae* or must be reallocated; these are as follows:

Hetschko (1930)	New combination, synonym or comments.
<i>Silvanus armatulus</i> Blackburn, 1891 : 118	<i>Silvanolomus armatulus</i> (Blackburn) comb. n.
<i>Silvanus monticola</i> Blackburn, 1891 : 118	<i>Monanus monticola</i> (Blackburn) comb. n.
<i>Silvanus birmanicus</i> Grouvelle, 1892 : 863	<i>Silvanoprus birmanicus</i> (Grouvelle) comb. n.
<i>Silvanus frater</i> Grouvelle, 1904 : 184	<i>Silvanoprus frater</i> (Grouvelle) comb. n.
<i>Silvanus porrectus</i> Walker, 1859 : 53	<i>Silvanoprus porrectus</i> (Walker) comb. n.
<i>Silvanus fauveli</i> Reitter, 1890 : 256	<i>Oryzaephilus fauveli</i> (Reitter) comb. n.
<i>Silvanus brevicornis</i> Erichson, 1842 : 218	Type not found, Blackburn (1903) places this species in <i>Myrabolia</i> (Erotylidae).
<i>Silvanus parviceps</i> Casey, 1916 : 136	<i>Cathartus longulus</i> Blatchley, 1910 : 564. Indiana [one broken type-specimen (Holotype?) in Purdue University, Indiana, compared with <i>S. parviceps</i> by Dr A. Provonsha at author's request]. <i>Silvanus parviceps</i> Casey, 1916 : 136. Holotype, sex indet., New York, (USNM, Washington) [examined]. Syn. n.

Hetschko (1930)

New combination, synonym or
comments.*Silvanus (Cathartoides) africanus*

Kessel, 1921 : 27

Type lost, description of species and subgenus (sides of pronotum margined) based on unique type does not suggest a member of the genera described in this study.

Silvanus costatus Steinheil, 1869 : 256

Type not found. Reitter (1880) suggested that this species was a Tenebrionid.

Silvanus retrahens Walker, 1858 : 207

Type lost, description inadequate.

Only one species, *Silvanus tropicalis* Van Dyke, has been described since Hetschko's catalogue.

In addition to the nominal subgenus, Grouvelle (1912) described four subgenera and Kessel (1921) one, *Cathartoides* (see above). In the present study subgenera have not been used. Three of Grouvelle's subgenera, *Cathartosilvanus* (4 spp.), *Protosilvanus* (5 spp.) and *Parasilvanus* (6 spp.) are raised to generic rank. Three new genera are described, *Pensus* (2 spp.), *Calpus* (1 sp.) and *Silvanoides* (2 spp.). The genus *Silvanus* (sensu stricto of the present revision) contains 17 species, including 5 new species.

II. GENERIC RELATIONSHIPS

Grouvelle (1912) distinguished subgenera within *Silvanus* using characters provided by the antennae, femoral line, distance between pro- and mesocoxae, body-form and pleurosternal suture (the last-mentioned being of little value). A study of the male genitalia, mouth parts and secondary sexual characters of Grouvelle's *Silvanus* and other genera with similar facies (*Silvanops*, *Silvaninus*, *Silvanoprus*, *Cathartus* and *Ahasverus*) has shown that Grouvelle's subgenera, except *Microsilvanus*, merit generic rank. *Microsilvanus* was erected for three species which are synonymized with *Silvanus recticollis* Reitter in the present study. The general facies of this species is indeed rather distinctive, as it is small and dull with anterior angles of the pronotum not or little produced laterally and has somewhat moniliform antennae. However, the parameres of *S. recticollis* are similar to those of other *Silvanus* and the antennae seem to represent merely an extreme case of the variation found in the genus.

The seven genera described in this revision seem to be fairly closely related, although *Parasilvanus* and *Protosilvanus* are more closely related to each other than to the other genera. Species of *Parasilvanus* and *Protosilvanus* are far more elongate than species in the other genera and have different antennae, secondary sexual characters, labial and maxillary palps. The close relationship of these two genera is shown by the mouth-parts (Text-figs 129-132) and the small tooth near the apex of the male metatibia of most species (Text-fig. 152). In addition, the males of *Protosilvanus fasciatus* sp. n. and *Protosilvanus carinatus* (Grouvelle)

have a tubercle on abdominal sternite 3 as in *Parasilvanus* and the male sternites 8 and 9 are similar in these genera.

The following characters combined, which include those used by Grouvelle (1912) in his key to the subfamily (pp. 384-385), will serve to distinguish the genera *Silvanus*, *Cathartosilvanus*, *Protosilvanus*, *Parasilvanus*, *Pensus*, *Calpus* and *Silvanooides* from the other known genera in the subfamily:

- (1) Tarsi simple, i.e. neither lobed nor appearing lobed and segment 3 not incrassate.
- (2) Thorax with sides finely denticulate, not margined; anterior angles usually produced antero-laterally.
- (3) Antennae terminated by a 3-segmented club (first club-segment not much narrower than second), apical segment not obviously elongate.

Some species of *Silvanoprus*, a genus in which segment 3 of the tarsus is incrassate (appearing lobed), are remarkably similar to *Silvanus*.

III. HABITATS AND DISTRIBUTION

Most of the Silvanidae are subcorticolous and the genera described here are usually found under the bark of fallen or felled trees. European and N. American species are commonly found beneath the bark of deciduous trees, especially oak (*Quercus* spp.) and sweet chestnut (*Castanea* spp.), less frequently under the bark of pine (*Pinus* spp.). African and oriental species have been found under the bark of *Ficus* etc. and the Australian *Silvanus lateritius* (Broun) beneath that of *Eucalyptus*. Fungal spores have been observed in the gut of specimens dissected for genitalia suggesting that mould, which abounds in the subcorticolous habitat, may form part of their diet.

Twelve species have been found associated with stored products imported to Britain, *Silvanus lewisi* Reitter, *S. productus* sp. n., *S. difficilis* sp. n., *S. proximus* Grouvelle, *S. inarmatus* Wollaston, *S. castaneus* MacLeay, *S. lateritius* (Broun), *S. bidentatus* (F.), *Cathartosilvanus vulgaris* (Grouvelle), *Protosilvanus lateritius* (Reitter), *Parasilvanus ocellatus* (Grouvelle), *P. fairmairei* (Grouvelle) and four of these *S. inarmatus* and *S. proximus* (both African), *S. lewisi* and *S. difficilis* (Oriental) occur fairly frequently although in small numbers. A direct connection between the natural habitat and stored products is suggested by field records for *S. proximus*, which is apparently common on oil-palm fruits (*Elaeisis*) and for *S. inarmatus*, which has been found on maize heads on several occasions. *Silvanus inarmatus*, *Parasilvanus ocellatus* and *P. fairmairei* have been found on timber in Britain and Italy and the occurrence of these and other species on stored produce may often be due to cross-infestation from dunnage and timber.

The distribution of the genera is as follows:

Silvanus – World, but apparently not represented in S. America.

Cathartosilvanus and *Pensus* – Nearctic and Neotropical.

Protosilvanus, *Calpus* and *Silvanooides* – Oriental.

Parasilvanus – Ethiopian.

Species are extremely widely distributed and their distribution may have been assisted by man through food and timber transportation and silviculture, as indicated above. The distribution of certain species, e.g. *Silvanus proximus* (African) in the West Indies and *Silvanus lateritius* (Australian) in Madeira and South Africa, can be explained on this basis.

IV. SECONDARY SEXUAL CHARACTERS

Secondary sexual characters are exhibited by the males and are probably used for alignment and gripping during copulation. Modification of the hind legs occurs in all genera, one or more of the following characters being found: trochanter with a spine, femur bearing a ridge, tibia with a row of spines or a tooth at its apex. In some *Parasilvanus* species the sutural stria is depressed towards the apex and in this genus and *Protosilvanus* the abdominal sternites may have a median tubercle. In *Cathartosilvanus vulgaris* the first visible sternite usually has a median longitudinal carina.

In all genera males, especially large individuals, tend to have more elongate thoraces than females.

V. NOTES ON SPECIFIC CHARACTERS, DESCRIPTIONS AND LABELLING

Specific characters are provided by pronotal form, particularly the anterior angles, puncturation of head and thorax, eye-size and temple-length. However, in certain species the shape of the pronotum is extremely variable, e.g. *Silvanus inarmatus* (Text-figs 51-56) and may lead to confusion. Other characters, apart from those given in the keys, are given in 'Comparative notes' and in difficult cases careful attention should be paid to these. Unfortunately while genitalia are useful at the generic level, they are only occasionally of use in separating very closely related species except in the genus *Parasilvanus*.

In descriptions of species 'length' is measured from apical margin of clypeus to apex of elytra; head-length from clypeal margin to back of vertex and breadth across base of temples; pronotal length from anterior margin to margin of basal foramen and breadth across widest part excluding the anterior angles; elytral length includes the scutellum and breadth is the maximum across the elytra. Ratios were calculated from measurements made on individuals chosen to cover the form and size range.

Figures have been drawn by the author and although the mandibles and labrum are partly visible from above these have been omitted. Illustration of the ♂ median lobe necessitated dissection and compression of this curved part of the genitalia. Puncturation has been drawn from scanning electron micrographs.

Generally locality data have been summarized for previously described species and a geographical arrangement for larger divisions and countries has been attempted. (The ex-Belgian territory in Africa, often referred to as Congo (Kinshasa), is given its current name, Zaire, throughout this paper.) Only reference numbers and a summary of habitat data are given for material collected by M. H. de Saeger in

the Garamba National Park (Zaire), since this material is fully documented by de Saeger (1956). Where the label data of primary types have been quoted verbatim, the sign '/' has been used to show the extent of each label. Except where it would obviously be of value to state the location of a particular specimen, a list of museums, etc., is given after the list of localities. A list of the abbreviations used for museums, etc., is given below.

AM	The Australian Museum, Sydney.
ANIC	Australian National Insect Collection, C.S.I.R.O., Canberra.
BMNH	British Museum (Natural History).
BPBM	Bernice P. Bishop Museum, Honolulu.
CAS	California Academy of Sciences, San Francisco.
IFAN	Institut Fondamental d'Afrique Noire, Université de Dakar, Senegal.
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels.
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
MD	Museu do Dundo, Companhia de Diamantes de Angola, Dundo, Lunda, Angola.
MF	Museum G. Frey, Entomologisches Institut, Tutzing.
MNHN	Muséum National d'Histoire Naturelle, Paris.
MRAC	Musée Royal de l'Afrique Central, Tervuren.
NMV	National Museum of Victoria, Melbourne.
PICL	Pest Infestation Control Laboratory, Slough.
QM	Queensland Museum, Fortitude Valley.
SAM	South Australian Museum, Adelaide.
TM	Természettudományi Múzeum, Budapest.
USNM	U.S. National Museum, Washington.
ZM	Institut für Spezielle Zoologie und Zoologisches Museum, Berlin.

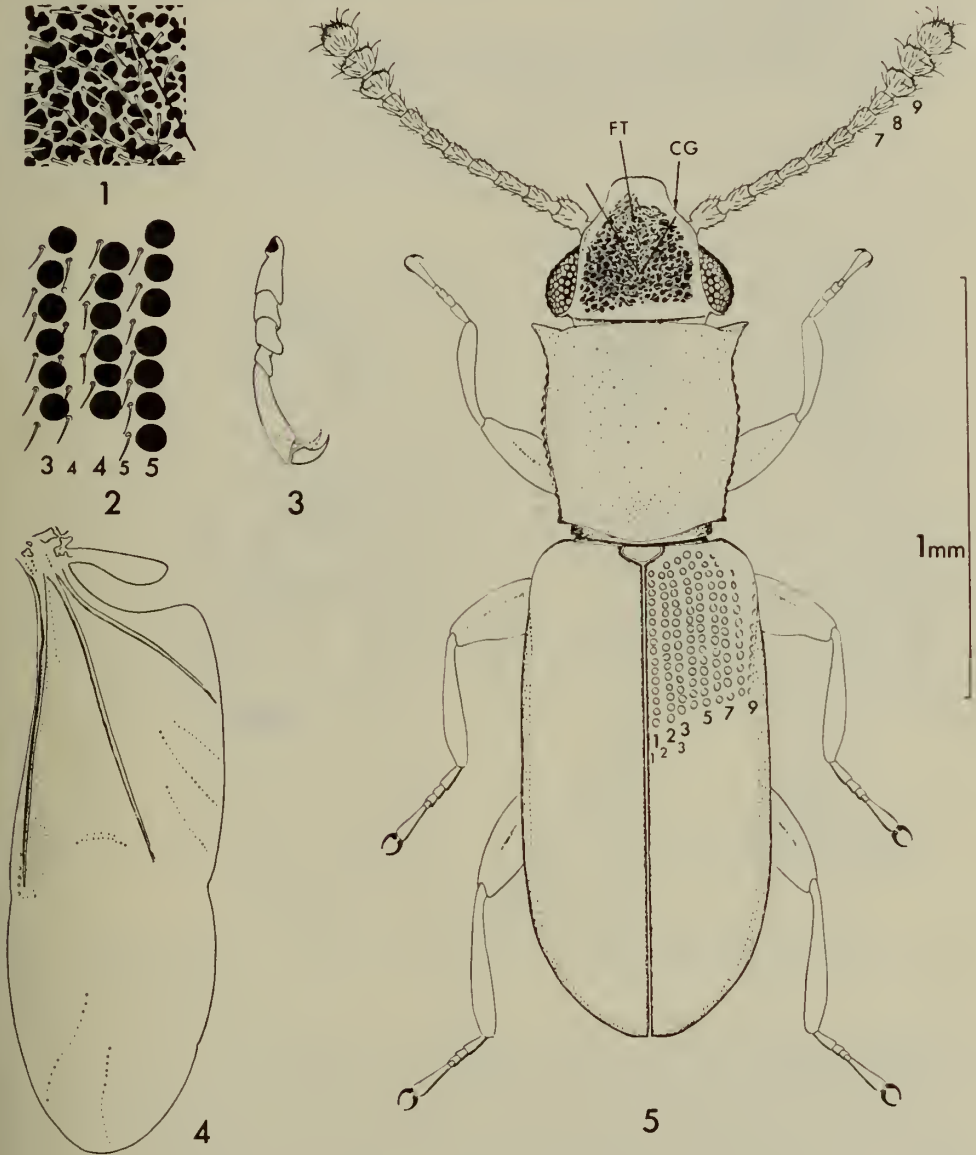
In addition to the author's written labels, type-labels as used at the BMNH, London, have been attached to type-specimens. These are small circular labels with the name of the type and a coloured border as follows: holotype, red; paratype, yellow; lectotype, violet; paralectotype, light blue.

VI. ACKNOWLEDGEMENTS

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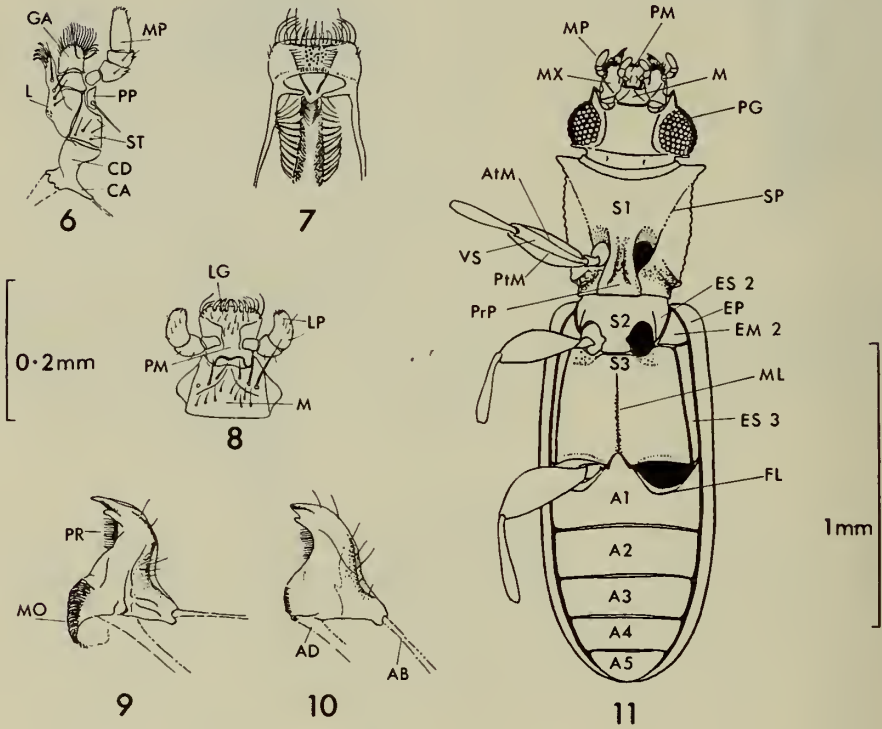


FIGS 1-5. *Silvanus lewisi* Reitter. 1, Head puncturation, detail from 5. 2, Strial punctures and setae. 3, Metatarsus. 4, Wing. 5, Dorsal side; FT, frontal triangle, CG, clypeogenal emargination.

VII. KEY TO GENERA

- 1 Antennal segment 8 much narrower than and obviously different from 7 (Text figs 166-169, 176); temple well-defined.
 Apical segment of labial palp smaller than previous segment (Text-fig. 131); apex of prosternal process only slightly broader than apex of mesosternum (Text-fig. 149). Ethiopian **PARASILVANUS** Grouvelle (p. 97)
- Antennal segment 8 not much narrower than 7, usually similar to it; temple well-to ill-defined or absent 2
- 2 (1) Elytral stria 7 moderately to strongly carinate; prosternal process and labial palps as in *Parasilvanus*; antennae may have spines on margins of segments 9 and 10 (Text-fig. 144). Oriental

PROTOSILVANUS Grouvelle (p. 89)



FIGS 6-11. *Silvanus lewisi* Reitter. 6, Maxilla. 7, Labrum. 8, Labium. 9, Left mandible, ventral. 10, Right mandible, dorsal. 11, Ventral side.

A 1-5, visible abdominal sternites; AB, tendon of abductor muscle; AD, tendon of adductor muscle; AtM, anterior margin; CA, cardo apodeme; CD, cardo; EM₂, epimerite of mesosternum; EP, epipleuron; ES₂₍₃₎, episternite of S₂ (S₃); FL, femoral line; GA, galea; L, lacinia; LG, ligula; LP, labial palp; M, mentum; ML, median line; MO, molar lobe; MP, maxillary palp; MX, maxilla; PG, post-gena; PM, prementum; PP, palpiger; PrP, prosternal process; PtM, posterior margin; PR, prosthema; S₁₋₃, pro-, meso- and metasternum; SP, sternopleural suture; ST, stipes; VS, ventral side.

- Elytral stria 7 not carinate; apex of prosternal process much broader than apex of mesosternum (Text-fig. 11); apical segment of labial palp larger than previous segment (Text-figs 8, 128); antennae without spines 3
- 3 (2) Eyes large; temple forming a narrow shelf for eye (Text-fig. 115); puncturation much coarser on pronotum than on head; anterior angles of pronotum little produced, lateral (Text-figs 115, 117); cuticle shining; femoral lines open (see below); ♂ genitalia with parameres as in Text-fig. 123. Oriental
SILVANOIDES gen. n. (p. 87)
- Eye and temple form not as above, without other characters combined 4
- 4 (3) Femoral lines open, i.e. diverging from margin of metacoxal cavities (Text-fig. 112); anterior margin of pronotum with lateral thirds or less, obviously sloped backwards to anterior angles (Text-figs 109-111, 114).
♂ genitalia, aedeagus with median lobe rounded to very slightly tapered at apex, parameres elongate with long setae, not forked at apex (Text-figs 100, 102, 104, 106). Nearctic and Neotropical
CATHARTOSILVANUS Grouvelle (p. 81)
- Femoral lines closed, i.e. forming margin of metacoxal cavities (Text-fig. 11); anterior margin of pronotum not as above 5
- 5 (4) Genae prominent laterally, triangular; anterior angles of pronotum strongly produced anteriorly, anterior margin concave (Text-figs 96, 97).
♂ genitalia as or similar to Text-fig. 84, parameres rather spatulate at apex; ♂ sternites 8 and 9 as in Text-fig. 88. New Guinea and New Ireland
CALPUS gen. n. (p. 79)
- Genae not prominent laterally; if anterior angles of pronotum concave on anterior margin, then only moderately produced anteriorly 6
- 6 (5) Pronotum as in Text-figs 90, 91, 93 and 94, with side margin usually slightly convex where it forms anterior angle; head and pronotum dull, puncturation dense, setiferous punctures ocellate; elytral epipleura with a high inner rim; ♂ genitalia, apex of median lobe extremely broad, parameres as in Text-figs. 81, 83). Nearctic and Neotropical *PENSUS* gen. n. (p. 77)
- Pronotum not as above; head and pronotum dull or shining, setiferous punctures not or slightly ocellate; elytral epipleura without a high inner rim; ♂ genitalia, apex of median lobe not extremely broad, parameres forked at apex (Text-figs 17-24). World *SILVANUS* Latreille (p. 47)

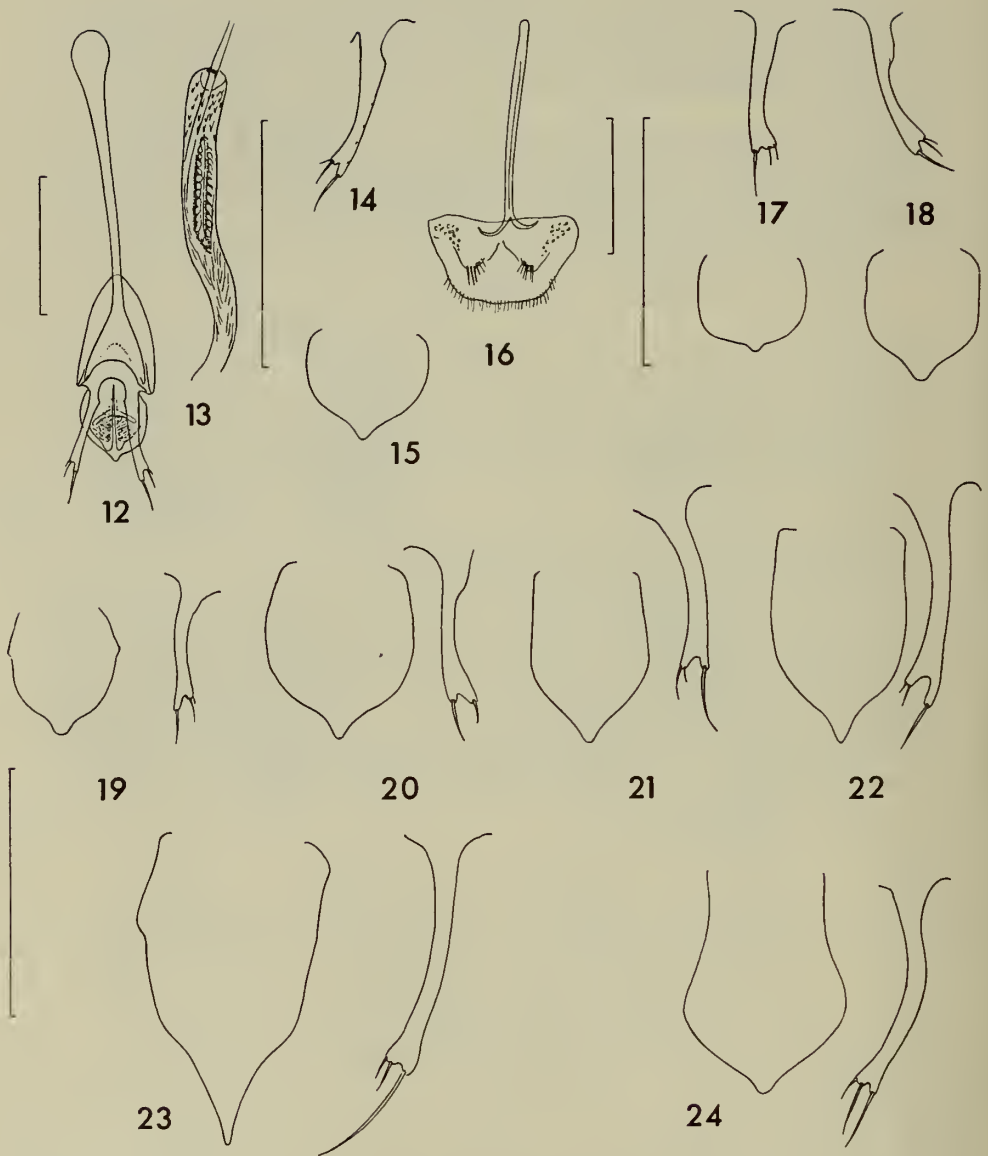
VIII. DESCRIPTION OF GENERA AND SPECIES, KEYS TO SPECIES

Silvanus Latreille

Silvanus Latreille, 1804 : 158. Type-species: *Ips unidentata* Olivier, by monotypy.
Leptus Duftschmidt, 1823 : 156. [Duftschmidt knew of Latreille's genus - he renamed it.]

Number of species: 17.

Length 1.83-3.49 mm; body moderately depressed and elongate; yellowish to reddish brown, with fine more or less decumbent golden pubescence. *Head* transverse, dull, densely punctured (e.g., *lewisi*, Text-figs 1 and 5) to shining and comparatively sparsely punctured, clypeus and a somewhat triangular region with apex extending to middle or back of head, in present study called 'frontal triangle' (Text-fig. 5), with puncturation less dense than on rest of head; clypeal margin very slightly emarginate; side of head emarginate where gena meets clypeus - 'clypeo-genal emargination' (Text-fig. 5); genae very slightly or moderately raised dorsally to form a low triangular prominence. *Antennae* 11-segmented, scape broader than segments 2-8, segment



FIGS 12-24. *Silvanus* male genitalia. 12-16, *S. lewisi* Reitter. 12, Male genitalia. 13, Internal sac. 14, Paramere. 15, Median lobe. 16, Sternites 8 and 9. 17-23, Median lobe and paramere. 17, *S. productus* sp. n. 18, *S. difficilis* sp. n. 19, *S. recticollis* Reitter. 20, *S. semus* sp. n. 21, *S. mediocris* Grouvelle. 22, *S. planatus* Germar. 23, *S. robustus* sp. n. 24, *S. rossi* sp. n. Scale lines = 0.2 mm.

8 shorter than 7 but not strongly differentiated from segments 2-7, segment 6 slightly smaller than 7, segments 9-11 broader than other flagellar segments and forming a distinct loose club, apical margins of these segments and apex of 11 with a few setae much longer than others (Text-fig. 5). *Eye* generally large or very large (small in *unidentatus*) and prominent; temples variable, long to very short (from equivalent to nearly one quarter length of eye to less than length of an eye-facet). *Mouth parts* as in Text-figs 6-10, maxillary palps with apical segment (segment 4) at least as long as segments 2 and 3 combined; labial palps with apical segment larger than penultimate; post-genal area variable in breadth. *Thorax* with pronotum almost quadrate to obviously elongate but not more than 1.4 times as long as broad; puncturation as on head; anterior margin almost straight medially, usually sinuate to anterior angles; anterior angles poorly to strongly developed, obtuse to finely tapered; side margins finely serrate (about 15-20 denticles each bearing a seta, denticles becoming obsolete on sides of anterior angles); posterior angles distinct or absent; posterior margin well-defined at sides, ill-defined in middle, not confluent with rim of foramen; surface with sides sloping away from disc to side margin, disc with shallow basal and apical depressions or with lateral longitudinal foveae extending from base to apex on each side of disc (e.g. Text-fig. 66). *Scutellum* transverse. *Prosternum* with sternopleural sutures terminating in anterior angles (Text-fig. 11); procoxal cavities broadly closed behind; prosternal process more or less channelled, obviously broader at apex than between coxae, apex distinctly broader than mesosternal apex. *Metasternum* with median line extending from apex almost to base (Text-fig. 11). *Legs* with tarsi 5-segmented, penultimate segment (segment 4) very small, segment 3 simple (Text-fig. 3); secondary sexual characters exhibited by ♂ as follows: metatibia usually bearing a row of spinules on posterior margin, metafemur with a ridge medially on ventral side (except in *recticollis*), metatrochanter sometimes with a spine. *Elytra* each with 9 rows of punctures forming striae; alternate interstriae with single and double rows of setae as illustrated in Text-fig. 2, not or narrowly explanate at sides; epipleura broad, tapering to apex or sometimes terminating just before it. *Wing* well-developed but venation much reduced, cubitus straight, one anal vein and indication of others, marginal vein (or veins?) terminating in a stigma (Text-fig. 4). *Metendosternite* with broad stem. *First visible sternite of abdomen* (abdominal sternite 3) with femoral line closed, i.e., forming margin of coxal cavity. *Genitalia*, ovipositor with long seta on stylus; aedeagus with median strut spatulate at apex (Text-fig. 12); parameres forked at apex, rather variable within species, usually bearing 1 or 2 setae on each fork, one seta often longer than other two (see Text-figs 17-24); median lobe acuminate (Text-fig. 23) to less strongly tapered and more rounded at apex (Text-figs 17-18) the following species have a median lobe similar to Text-figs 20: *inarmatus*, *proximus*, *castaneus*, *lateritius*, *muticus* and *bidentatus*; internal sac as in Text-fig. 13 or with complex chitinous structure longer; ♂ abdominal sternites 8 and 9 as in Text-fig. 16.

DISTRIBUTION. World.

KEY TO SPECIES OF *SILVANUS*

- 1 Head and pronotum as in Text-fig. 43 (sides of pronotum may be slightly more convergent to base).
 - Dorsal surface shining; puncturation of clypeus and frontal triangle of head fine and rather sparse; eyes large, temple acute; posterior angles of pronotum well-defined. Ethiopian *mediocris* Grouvelle (p. 57)
 - Head and pronotum not as above 2
- 2 (1) Sides of pronotum more or less parallel to apex and anterior angles, as in Text-figs 41-42; antennae somewhat moniliform (Text-figs 39, 40).
 - Eyes small; dull, small species length 1.69-2.19 mm, general facies characteristic. Oriental and Ethiopian *recticollis* Reitter (p. 55)
 - If sides of pronotum more or less parallel to apex, then anterior angles not as above and eyes larger; antennae not somewhat moniliform 3

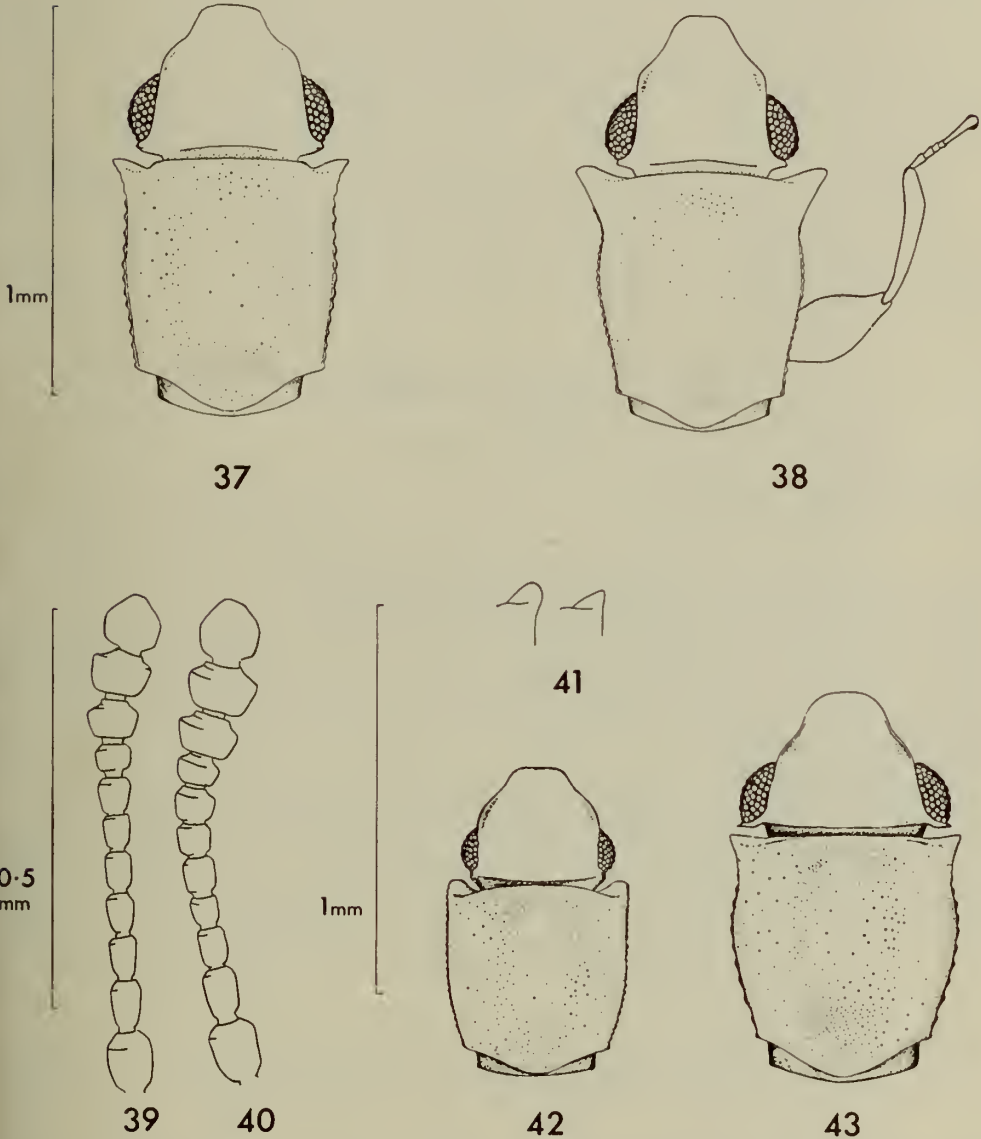
- 3 (2) Anterior angles of pronotum comparatively obtuse, not strongly produced laterally, Text-figs 25-30 4
 - Anterior angles of pronotum moderately to strongly acute, may be strongly produced laterally, Text-figs 31-38 9
- 4 (3) Posterior angles of pronotum absent, sides rounded to base (Text-figs 60-61). Length 2.06-2.59 mm. Nearctic *nitidulus* LeConte (p. 63)
 - Posterior angles of pronotum present 5
- 5 (4) Pronotum as in Text-figs 44-46; head and pronotum dull; puncturation on frontal triangle similar to that on rest of head 6
 - Pronotum as in Text-figs 57, 59; general appearance of head and pronotum either rather dull or shining; interspaces on frontal triangle shining and puncturation obviously different from that at side of head 8
- 6 (5) Pronotum more elongate, head comparatively larger with relatively large eyes, appearing almost as broad across eyes as pronotum across anterior angles as in Text-fig. 44; head with strongly rugose puncturation and setiferous punctures rather prominent; elytra elongate 2.10-2.16 times as long as broad. Length 2.47-2.87 mm. Ethiopian *semus* sp. n. (p. 58)
 - Pronotum less elongate, head and pronotum combined not as in above Text-fig.; puncturation on head not strongly rugose, setiferous punctures not prominent; elytra may be less elongate (1.83-2.10 times as long as broad) 7
- 7 (6) Pronotum usually with sides less strongly convergent to base, appearing more quadrate, Text-figs 45 (51-56); prosternal process broadly grooved between coxae, where breadth is two-thirds of apical breadth (Text-fig. 49); elytral epipleura gradually tapered to apex (Text-fig. 47). Ethiopian and associated with stored products *inarmatus* Wollaston (p. 59)
 - Pronotum with sides more strongly convergent to base, Text-fig. 46; prosternal process narrowly grooved between coxae where breadth is half of apical breadth (Text-fig. 50); elytral epipleura abruptly tapered before apex, more or less absent apically (Text-fig. 48). Ethiopian and apparently introduced to the Neotropical region; also associated with stored products *proximus* Grouvelle (p. 61)
- 8 (5) Ridge behind eye more pronounced, region comparatively narrower (rather shelf-like), eyes usually more elongate and larger (Text-fig. 58); abdominal sternites 2-5 with coarse setiferous punctures; head and pronotum moderately shining; ventral surface shining; pronotum as in Text-fig. 59 or with sides less convergent to base. Nearctic *planatus* Germar (p. 64)



FIGS 25-36. *Silvanus*, outline of side of pronotum. 25, *S. semus* sp. n. 26, *S. inarmatus* Wollaston. 27, *S. proximus* Grouvelle. 28, *S. unidentatus* (Olivier). 29, *S. planatus* Germar. 30, *S. nitidulus* LeConte. 31, *S. castaneus* MacLeay. 32, *S. bidentatus* (F.). 33, *S. muticus* Sharp. 34, *S. robustus* sp. n. 35, *S. lateritius* (Broun). 36, *S. difficilis* sp. n.

Ridge behind eye less pronounced, region usually broader; eyes usually less elongate and smaller (Text-fig. 57); abdominal sternites 2-5 with fine setiferous punctures; head and pronotum rather dull; ventral surface dull; pronotum as in Text-fig. 57. Palaeartic and introduced to U.S.A. and Chile.

unidentatus (Olivier) (p. 65)



FIGS 37-43. *Silvanus*. 37, *S. rossi* sp. n., head and pronotum. 38, *S. productus* sp. n., head and pronotum. 39-42, *S. recticollis* Reitter. 39, Antenna of specimen from Calcutta. 40, Antenna of specimen from Leopoldville. 41, Variants of anterior angle of pronotum. 42, Head and pronotum. 43, *S. mediocris* Grouvelle, head and pronotum.

- 9 (3) Pronotum as in Text-fig. 38, anterior angles large and strongly produced; head across eyes: pronotum across anterior angles, 10 : 12.3-12.6.
 Eyes large, temple as long as an eye-facet; length of side of pronotal anterior angles at least three-quarters of length of eye. Oriental (one stored-products record) **productus** sp. n. (p. 55)
- Pronotum not as above, if similar (i.e. *difficilis*) then anterior angles generally much less produced and head across eyes: pronotum across anterior angles, 10 : 10.6-11.6 10
- 10 (9) Eyes extremely large (Text-fig. 5) separated dorsally, across front, by 1.5-1.7 times their length; temples shorter than an eye-facet.
 Pronotum as in Text-fig. 5, sides not strongly convergent to base; ♂ genitalia, Text-fig. 15. Oriental and associated with stored products
lewisi Reitter (p. 53)
- Eyes not extremely large, if pronotum similar (i.e. *rossi*) then eyes separated dorsally, across front, by 1.9-2.1 times their length and temple as long as an eye-facet 11
- 11 (10) Anterior margin of pronotum convex and side margin concave where they form anterior angle, sides of pronotum not strongly convergent to base (Text-fig. 37).
 Eyes larger, puncturation of frontal triangle not conspicuously different from rest of head; elytra moderately explanate at sides (similar to *lewisi*, Text-fig. 5); genitalia with median lobe expanded before apex (Text-fig. 24). India, Thailand and New Guinea **rossi** sp. n. (p. 54)
- Either sides of anterior angles of pronotum entirely different or without above characters combined 12
- 12 (11) Pronotum with sides of anterior angles more or less straight (Text-fig. 62), disc broadly depressed, usually elongate (as illustrated); head with temples as long as an eye-facet, clypeus and frontal triangle with interspaces flat and shining, obviously differentiated from rest of head.
 Elytra with sides almost parallel, rounded at apex, not obviously explanate at sides (Text-fig. 62). Australian and Oriental (Singapore) sometimes associated with stored products **castaneus** MacLeay (p. 66)
- Pronotum not as above; head with temples as long or longer than an eye-facet, frontal triangle with puncturation similar to that on rest of head, not obviously differentiated 13
- 13 (12) Anterior angles abruptly developed from side of pronotum, strongly produced laterally, narrow (Text-figs 66, 67); pronotal disc usually with deep (sometimes shallow) well-defined lateral foveae (Text-fig. 66); temples as long as 2 eye-facets or slightly shorter (eye diam.: temple, 4.5-7.4 : 1). Palaeartic and introduced to U.S.A., single specimens seen from India, Thailand and Hawaii (on one occasion found associated with stored products)
bidentatus (Fabricius) (p. 68)
- Anterior angles of pronotum not abruptly developed or if similar, then without above characters combined 14
- 14 (13) Pronotum and head as in Text-fig. 68; pronotal disc with well-defined but shallow lateral foveae, anterior angles gradually developed from sides of pronotum, angles with rather straight sides; temples as long as 0.5-1.0 eye facets (eye diameter: temple, 10.5-17.6 : 1); elytra broad (1 : 2.0-2.1), strongly tapered to apex and with lateral margin obviously explanate. Nearctic and Guatemala **muticus** Sharp (p. 70)
- Pronotum and head not as in above Text-fig., without above characters combined 15
- 15 (14) Lateral margins of elytra obviously explanate; pronotum with sides curved from base to anterior angles, not obviously sinuate before posterior angles

(Text-fig. 75), usually rather gibbous anteriorly, disc with a shallow depression before base; head rather narrow (10.5-11.2 : 10); antennal club segments more quadrate, club appearing more elongate (Text-fig. 77); ♂ genitalia, Text-fig. 23. Oriental **robustus** sp. n. (p. 71)

- Either lateral margins of elytra not explanate on basal two-thirds or if so (*difficilis*), then pronotum obviously sinuate before posterior angles and antennal club appearing less elongate (Text-fig. 78) 16

16 (15) Eyes smaller, separated ventrally by 2.3-3.7 times breadth; temple as long as 1-1.5 eye-facets; pronotum and head as Text-fig. 63; head broader, 12.0-12.6 : 10; elytra longer, 2.2-2.3 : 1; length 2.47-2.84 mm. Australia, New Zealand and introduced (?) to Madeira and South Africa, sometimes associated with stored products **lateritius** (Broun) (p. 71)

- Eyes larger, separated ventrally by 1.1-2.1 times breadth; temple as long as 1-2.5 eye-facets; pronotum and head as in Text-figs 69-74; head narrower, 10.8-12.0 : 10; elytra shorter, 2-2.1 : 1; length 2.17-2.64 mm. Oriental including Cairns (Australia) and associated with stored products

difficilis sp. n. (p. 73)

Silvanus lewisi Reitter

(Text-figs 1-16)

Silvanus lewisi Reitter, 1876 : 57. LECTOTYPE ♂ (here designated, see below), JAPAN (BMNH, London) [examined].

Length 2.07-2.50 mm. Dull, usually yellow-brown. *Head* broader than long (11.5-11.8 : 10) narrower across eyes than pronotum across anterior angles (10 : 11.5-11.7); puncturation coarse and dense, particularly so towards sides and base of head (Text-figs 1 and 5); eyes extremely large and prominent, about half as long as head, longer than twice distance from eye to clypeogenal emargination, separated dorsally, across front, by 1.5-1.7 times their length and ventrally by 1.0-1.5 times their breadth; temples very small, equal to one half or less of an eye-facet diameter. *Antennae* (Text-fig. 5) with segments 1-6 slightly more elongate than in such species as *unidentatus*. *Pronotum* as in Text-fig. 5 or with sides less sinuate, never strongly convergent to base, longer than broad (11.5-11.9 : 10); puncturation dense, as on head; anterior angles with sides almost straight and apex 'sharp', about half as long as eye; disc slightly depressed towards base and sides; posterior angles almost right angles; wing, Text-fig. 4. *Elytra* (Text-fig. 5) twice as long as broad, setal punctures slightly tuberculate on disc, becoming strongly tuberculate at sides; margins distinctly explanate. *Legs* in ♀ simple; in ♂ metafemur with a low short ridge on anterior margin extending from basal one-sixth to one-third and metatibia with a row of spinules along posterior margin. *Metatarsus*, Text-fig. 3. *Genitalia* ♂, Text-figs 12-15, ♂ sternites 8 and 9, Text-fig. 16.

Number seen: 80.

Lectotype, present designation, ♂, length 2.67 mm, with 'Type [ptg., circular red-bordered label]/Type 5.3.76 [circular label]/Japan G. Lewis 1910 - 320/5.3.76/Lewisi Reitt.'

COMPARATIVE NOTES. A rather distinct species, due to its large eyes. It is most closely related to three new species: *rossi*, *productus* and *difficilis*. Its large eyes and very small temples distinguish it from *rossi* and *difficilis* and its pronotal form from *productus*.

DISTRIBUTION. Oriental, including N. Queensland of Australia, and apparently introduced to and imported from the Ethiopian region. INDIA: Madhya Pradesh – Sendhara, South India – Cinchona (Anaimalai Hills), Coimbatore, Dohnavur, Kanara, Mysore; CEYLON: Kandy; CHINA: Kwangchow [Canton]; VIETNAM (SOUTH): Prov. Nghe-An and Saigon; TAIWAN: Taihoria; JAPAN (type-locality); WEST MALAYSIA: Kuala Lumpur; SINGAPORE: Seletar (another record ‘Singapore’ and found on imports to Britain from Singapore); JAVA: Soekaboemi; BORNEO: North – Upper Kinabatangan R, South East – Martapura; PHILIPPINES: Mindanao; NEW GUINEA: Cyclops Mts (Sabron), Finschhafen and Hollandia; SOLOMON IS: Guadalcanal Kukum; AUSTRALIA: N. Queensland, Cardstone; CONGO: Brazzaville; GHANA: Komenda and Pretsea. In BMNH, London; CAS, California; MF, Munich; TM, Budapest; PICL, Slough; ZM, Berlin; and Australian specimens in ANIC, Canberra.

HABITATS. *S. lewisi* is often imported to Britain in small numbers on stored products or on dunnage, usually from the Oriental region but also from Africa. Desiccated coconut from Ceylon often harbours this species and it has been found on tapioca flour from Thailand and on rice and pulses probably from Burma, etc. African records include residues of bark and gum arabic, Nigerian groundnut kernels and red beans from Mombasa.

This species has been collected at light (Vietnam and West Malaysia) and under bark of tree stumps (Singapore). In Ghana it has been collected on freshly fallen coconut palm.

Silvanus rossi sp. n.

(Text-fig. 37)

Length 2.29–2.58 mm. Facies and puncturation as *lewisi* but darker than usual for this species. Head broader than long (11.3–11.7 : 10) narrower across eyes than pronotum across anterior angles (10 : 11.1–11.7); puncturation dense, frontal triangle not conspicuous; eyes slightly less than half as long as head, length of eye less than twice distance from eye to clypeo-genal emargination, eyes separated ventrally by at least twice their breadth, dorsally, across front by 1.9–2.1 times their length: temples as long as an eye-facet. Pronotum (Text-fig. 37) similar to *lewisi*, longer than broad (10.0–12.3 : 10). Elytra 2.2–2.1 times as long as broad. Legs in ♀ simple; in ♂ metafemur with a short low ridge towards base of middle third of ventral side and metatibia with a row of spinules on posterior margin. Genitalia ♂, median lobe more elongate than in *lewisi*, expanded before tapering to apex (Text-fig. 24).

Holotype ♂, length 2.56 mm, INDIA: W. Almora Divn, Kumaon, U.P. iii. 1917 (*H. G. Champion*) 548, in BMNH, London.

Paratypes (6). 1 ♀ with the same data as holotype; 1 ♂ from the same locality but collected by Champion, ii. 1916 and with the number 487e; 1 ♂ with same data but without date; 1 ♂, 1 ♀, THAILAND: E. slope Doi Sutep, 1100–1275 m, 15.vii.1962 (*E. S. Ross and D. Cavagnaro*). Indian paratypes in BMNH, London; Thailand paratypes in CAS, California. 1 ♀, NEW GUINEA: Wum, Upper Jimmi V., 840 m, light trap, 18.vii.1955 (*J. L. Gressitt*), in BPBM, Honolulu.

COMPARATIVE NOTES. Very closely related and similar to *lewisi* but may be distinguished by its smaller eyes and larger temples. Other minor differences, only of value when *lewisi* is available for comparison, are found in the pubescence, which is less obvious in *rossi*, the anterior angles of the pronotum, which are usually a little less tapered in *rossi* and the antennae which are slightly less elongate in this new species. The form of the pronotum distinguishes it from *difficilis*.

DISTRIBUTION. Oriental; India, Thailand and New Guinea.

Silvanus productus sp. n.

(Text-figs 17, 38)

Length 2.00–2.36 mm. Puncturation and antennae as in *lewisi*. Head broader than long (11.5–11.9 : 10), much narrower across eyes than pronotum across anterior angles (10 : 12.3–12.6); eyes separated ventrally by less than twice their breadth, dorsally by about twice their length; temples as long as an eye-facet. Pronotum as in Text-fig. 38, longer than broad (12.9–13.3 : 10); anterior angles strongly produced (diagnostic for the species) nearly as long as an eye (equal to at least three-quarters of its length); disc moderately depressed near apex and at sides, more strongly depressed towards base. Elytra 2.0–2.1 times as long as broad, similar to elytra in *lewisi*. Legs. Femora (Text-fig. 38) broader than in *lewisi*; in ♀ legs simple, in ♂ metafemur with a prominent ridge along anterior margin, extending from basal quarter to one half. Metatibia with spinules along posterior margin. Genitalia ♂, Text-fig. 17.

Holotype ♂, length 2.36 mm, SINGAPORE: Bukit Timan Nat. Res., under bark of standing dead tree, 13.xi.1966, in BMNH, London.

Paratypes (4). 1 ♀, with same data as holotype; 1 ♂, WEST MALAYSIA: Johore, Kluang saw mills, 12.vii.1932, this and the previous specimen in BMNH, London; 1 ♀, collected on Malaysian sago flour imported to Britain, H 2869, 1971 (*T. Rhynehart*), in PICL, Slough; 1 ♀, JAVA: Batavia [Jakarta], 1898 (*Biró*), in TM, Budapest.

COMPARATIVE NOTES. This species is closely related to *lewisi* and *difficilis*, and some forms of the latter are very similar. Generally it may be distinguished from both by the shape of the anterior angles of the pronotum and by the pronotal width across these angles relative to head width across eyes. Forms of *difficilis* with similar anterior angles may be distinguished by the head which appears relatively larger and the epipleura which are slightly more tapered to the apex than in *productus*.

DISTRIBUTION. Oriental; West Malaysia, Singapore and Java.

HABITATS. See type-designations.

Silvanus recticollis Reitter

(Text-figs 19, 39–42)

? *Leucohimatium breve* Wollaston, 1873 : 170. Holotype sex indet., JAPAN [Dr S. Hisamatsu brought the description of this species to my attention; it is almost certainly the same species as *recticollis* but I have failed to locate the type, which is said to be in the BMNH, London.]

Silvanus recticollis Reitter, 1876 : 61. LECTOTYPE (here designated, see below), JAPAN (BMNH, London) [examined].

Silvanus reflexus Reitter, 1880 : 25. Holotype sex indet., SICILY (ZM, Berlin) [examined].
Syn. n.

Silvanus vitulus Grouvelle, 1882 : 294. Holotype sex indet., SULAWESI [Museo Civico di Storia Naturale, Genoa - Dr D. Guiglia compared the type with *recticollis* at author's request].

Syn. n.

Silvanus (Microsilvanus) vitulus Grouvelle; Grouvelle, 1912 : 332.

Silvanus (Microsilvanus) pumilus Grouvelle, 1912 : 332. LECTOTYPE (here designated, see below), THAILAND (MNHN, Paris) [examined]. **Syn. n.**

Silvanus (Microsilvanus) minimus Grouvelle, 1912 : 334. LECTOTYPE (here designated, see below), VIETNAM (SOUTH) (MNHN, Paris) [examined]. **Syn. n.**

Length 1.69-2.19 mm. Small, dull species. *Head* (Text-fig. 42) slightly broader than long (10.5-11.4 : 10), narrower across eyes than pronotum across anterior angles (10 : 11.2-12.0); vertex densely punctured with coarse punctures (as long as an eye facet or less) and finer setiferous punctures on interspaces, clypeus less densely punctured; genal margins raised; antennae with segment 8 almost quadrate to distinctly transverse, tending to be more transverse in African specimens (Text-figs 39-40). *Pronotum* (Text-fig. 42) slightly longer than broad, appearing quadrate (length : breadth, 10.1-10.8 : 10); puncturation as on vertex of head; anterior angles produced anteriorly, usually somewhat rounded apically as in Text-fig. 42, to very slightly produced laterally (Text-fig. 41, left-hand figure); disc moderately depressed towards base, apex and sides; disc of *mesosternum* slightly depressed. *Elytra* 1.8-1.9 times as long as broad. *Ventral puncturation*, head and mesosternum similar to vertex of head, disc of metasternum and 1st abdominal sternite, and whole of other sternites with finer puncturation. Apparently without secondary sexual characters. *Genitalia* ♂, median lobe and paramere, Text-fig. 19.

Number seen : 30.

I have not seen the types of *vitulus* Grouvelle but Dr D. Guiglia (Genoa Museum) has kindly compared a specimen of *recticollis* with Grouvelle's type. I believe that *reflexus* (undoubtedly imported to Sicily), *vitulus*, *pumilus* and *minimus* are synonymous with *recticollis*.

Lectotype of *recticollis* Reitter, present designation, length 2.25 mm, sex indet., with 'Type H.T. [ptg., circular red-bordered label]/Japan G. Lewis 1910-320/Japan m. recticollis [MS label]'

Lectotype of *pumilus* Grouvelle, present designation, length 1.88 mm, sex indet., with 'Siam C^a. Casteln [Grouvelle's MS]/Type [ptg., on pink label]/pumilus Grouv. [Grouvelle's MS]', left hand specimen on card mount. Paralectotype 1.60 mm, right hand specimen on same mount as lectotype.

Lectotype of *minimus* Grouvelle, present designation, length 2.19 mm, sex indet., with 'Saigon [Grouvelle's MS]/Type [ptg., on pink label]/minimus Grouv. [Grouvelle's MS]', left hand specimen on card mount. Paralectotype, length 2.14 mm, right hand specimen on same mount as lectotype.

COMPARATIVE NOTES. The general facies of head and pronotum, combined with small size, readily distinguishes this species from all others, hence most of the species synonymized here were placed in a separate subgenus, *Microsilvanus*, by Grouvelle (1912) (see page 41 of the present study). Subgenera have not been used in this revision.

DISTRIBUTION. Oriental and Ethiopian. INDIA: Calcutta (MNHN, Paris); THAILAND (type-locality); VIETNAM: Saigon (type-locality) and Hanoi (TM, Budapest); LAOS: Annaur (TM, Budapest); SULAWESI: Makassar (type-locality); JAPAN (type-locality) and more recently collected in Matsuyama; RYUKYU IS: Iriomote (Ehime University collection). MAURITANIA: Bafrechie (IFAN, Dakar); CONGO: Brazzaville; ZAIRE: Garamba, Kivu, Leopoldville (TM, Budapest and IRSNB, Brussels); RHODESIA: Wankle National Park (BMNH, London).

HABITATS. This species has been collected at light in both the Oriental and Ethiopian regions.

Silvanus mediocris Grouvelle

(Text-figs 21, 43)

Silvanus mediocris Grouvelle, 1889 : 106. Holotype sex indet., IVORY COAST (MNHN, Paris) [examined].

Length 2.16–2.49 mm. General appearance smooth and shining. *Head* broader than long (12.8–13.0 : 10), across eyes narrower than across pronotal anterior angles (10 : 10.6–11.0); clypeus and frontal triangle which extends to back of vertex, with rather sparse fine puncturation—punctures about one-fifth of eye-facet diameter, smooth and shining; sides of head with large irregular punctures, comparatively rough but shining, interspaces with very fine setiferous punctures which sometimes have margins raised, setae about twice eye-facet diameter; eyes large, very prominent; temples acute, equivalent to an eye-facet diameter, or slightly more. *Pronotum* shining, longer than broad (11.4–12.1 : 10), form as in Text-fig. 43, with large punctures, breadth as much as twice eye-facet diameter and fine setiferous punctures on narrow interspaces; sides appearing rugose; anterior angles acute; disc depressed towards base and slightly towards apex; posterior angles obtuse; ratio of breadth of pronotum across posterior angles to that across elytral humeri, 10 : 15.3–16.3; prosternal process as in *proximus*. *Elytra* 2.04–2.09 times as long as broad, shining, disc moderately depressed; setiferous punctures sometimes somewhat tuberculate, setae shorter than those on head; epipleura similar to *proximus* but elytral apex not terminating in a distinct tooth. *Legs*. Metafemur in ♀ simple, in ♂ ventral side with a lamellate ridge obliquely traversing median one-third; metatibia without secondary sexual characters. *Genitalia* ♂, median lobe and paramere, Text-fig. 21.

Number seen : 12.

Holotype of *mediocris* Grouvelle with 'Assinie Cote occid. Afrique Ch. Alluaud 1886 [ptg.]/Type [ptg.]/*Silvanus mediocris* Grouv./*S. mediocris* Grouv. ty.', unique. Although in the original description there is no indication of the number of specimens seen, Grouvelle (1892b) referring to his description states 'Assinie, 1 exempl.'

COMPARATIVE NOTES. The form of the head and pronotum and the shining appearance distinguish this species.

DISTRIBUTION. Ethiopian. IVORY COAST: Assinie (holotype) and Tonkoui; GHANA: Kumasi; NIGERIA: Ile-Ife; CAMEROUN; ZAIRE: Dimonika, Eala, Kivu,

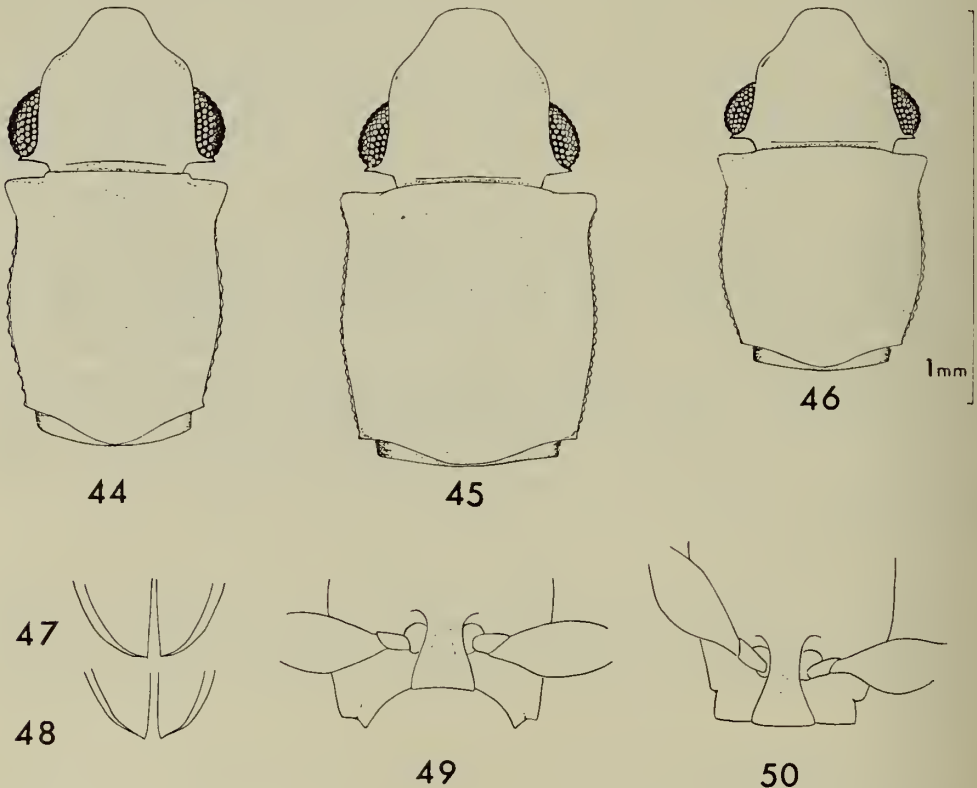
Lulongo and 59 km S of Tshela; UGANDA: Ruwenzori Range, Semliki Forest. In BMNH, London; CAS, California; IFAN, Dakar; MNHN, Paris; MRAC, Tervuren; PICL, Slough; TM, Budapest.

HABITAT. In forest humus (Zaire) and at light (Ghana).

Silvanus semus sp. n.

(Text-figs 20, 44)

Length 2.47–2.87 mm. Head slightly broader than long (10.8–11.3 : 10); not or slightly narrower across eyes than across pronotal anterior angles (10 : 10.0–10.7); surface dull, puncturation rugose with prominent narrowly ocellate, setiferous punctures (breadth including rim one half of eye-facet diameter) situated on narrow interspaces of coarse punctures – largest of these being as broad as an eye-facet; setae two to three times eye-facet diameter; eyes moderately prominent; temples acute, length equal to an eye-facet diameter, or slightly less. Pronotum longer than broad (12.4–12.6 : 10), Text-fig. 44; dull, with puncturation similar to head but margins of setiferous punctures not so obviously raised, at sides puncturation particularly



FIGS 44–50. *Silvanus*. 44, *S. semus* sp. n., head and pronotum. 45, 47, 49, *S. inarmatus* Wollaston. Head and pronotum, elytral apices (ventral) and base of prosternum (for prosternal process). 46, 48, 50, *S. proximus* Grouvelle, same.

coarse and dense; anterior angles as in Text-fig. 44, not produced beyond anterior margin; disc depressed towards base and apex, median area slightly raised; posterior angles more or less acute; ratio of breadth of pronotum across posterior angles to that across elytral humeri, 10 : 15.2-16.1; prosternal process similar to *proximus*. *Elytra* 2.10-2.16 times as long as broad, disc not depressed; interspaces and interstriae with tuberculate setiferous punctures, setae a little shorter than those on head; epipleura as in *proximus* but never terminating in a strong tooth. *Legs*. Metafemur and metatibia simple in ♀; in ♂ metafemur with a low ridge obliquely traversing ventral side from basal one quarter to one half and metatibia with a row of spinules as in *proximus*. *Genitalia* ♂, Text-fig. 20.

Holotype ♂, length 2.69 mm, SOUTH AFRICA: Port St John, Pondoland (Cape of Good Hope), ix.1923 (R. E. Turner), in BMNH, London.

Paratypes (31). 15 ♀, 16 ♂ with the same data as the holotype; 1 ♂, MADAGASCAR: Perinet sur Varongy, 16.i.1964 (*Brunk*) Col. CTFT No. 115. Six in PICL, Slough, rest in BMNH, London.

COMPARATIVE NOTES. Very closely related to *proximus* but comparatively larger with more elongate pronotum of different form, having more pronounced anterior angles and less obtuse posterior angles. The pronotal form is also somewhat similar to that in the Oriental *difficilis* sp. n. but differs in not having the anterior pronotal angles produced beyond the anterior margin.

Silvanus inarmatus Wollaston

(Text-figs 45, 47, 49, 51-56)

Silvanus inarmatus Wollaston, 1867 : 69. LECTOTYPE ♂ (here designated, see below), CAPE VERDE IS. (BMNH, London) [examined].

Silvanus quadraticollis Reitter, 1876 : 62. LECTOTYPE (here designated, see below), MADAGASCAR (MNHN, Paris) [examined]. **Syn. n.**

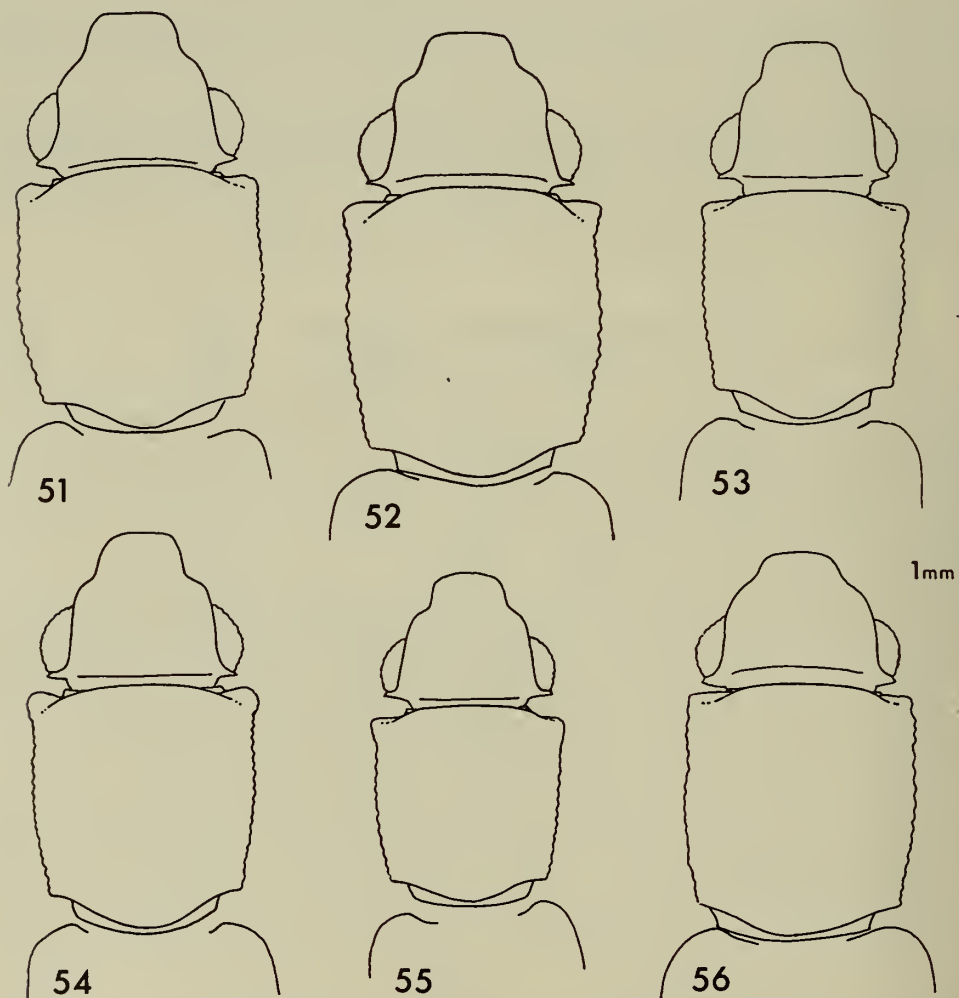
Silvanus hebetatus Grouvelle, 1912 : 339. LECTOTYPE ♂ (here designated, see below), TANZANIA (BMNH, London) [examined]. **Syn. n.**

Length 1.95-2.73 mm. *Head* broader than long (12.1-12.7 : 10) appearing much narrower than prothorax (ratio of breadth across eyes to that across pronotal anterior angles, 10 : 11.2-11.5); dull with punctures variable in size (diameter, equal to one half of eye-facet or less), most separated by not more than one half of diameter, some confluent, interspaces with fine setiferous punctures, setae as long as twice diameter of eye-facet; eyes large, moderately prominent; temples acute, as long as or slightly shorter than diameter of an eye-facet. *Pronotum* variable in form, almost quadrate to more obviously trapezoid, length : breadth 10.9-11.6 : 10 (Text-figs 45, 51-56); dull with punctures larger than eye-facets, interspaces very narrow, setation as on head; anterior angles more or less rounded, sometimes almost right-angles (e.g. Text-fig. 56); disc shallowly to moderately depressed towards base and apex; posterior angles almost right-angles, slightly raised dorsally, ratio of breadth of pronotum across posterior angles to that across elytral humeri, 10 : 13.1-13.4; *prosternal process* broadly grooved between coxae where breadth is two thirds of apical breadth (Text-fig. 49). *Elytra* 2.04-2.10 times as long as broad, disc moderately depressed; interstriae and interspaces with fine tuberculate setiferous punctures, setae slightly shorter than those on head; epipleura more or less flat, gradually tapered to apex (Text-fig. 47). *Legs*. In ♀ metafemur simple and metatibia as in *proximus* or slightly more expanded apically but without a row of spinules; in ♂ metafemur with a low ridge on anterior margin which extends from basal quarter to half, metatibia distinctly expanded from basal third to apex and bearing a row of spinules on posterior margin.

Number seen : 154.

Lectotype of *inarmatus* Wollaston, present designation, ♂, length 2.98 mm, with 'Type [BM circular, red-bordered label]/*inarmatus*, Woll. [MS]'. No locality data, in Wollaston's Cape Verde collection in BMNH, London, a small black paint mark traversing the right-hand corner of the card mount - Wollaston's mark denoting S. Iago as the locality. Paralectotypes of *inarmatus*, 6 with a black paint mark as the lectotype, BMNH, London.

Lectotype of *hebetatus* Grouvelle, present designation, ♂, length 2.51 mm, with 'Type [BM circular red-bordered label]/*Caia Zambesi* H. Swale/Bark/Silvanus *hebetatus* ty Grouv. [Grouvelle's MS]/27.6.10 *Caia* H. Swale/Type [orange label



FIGS 51-56. *Silvanus inarmatus* Wollaston, head and pronotum. 51, Rhodesian specimen ♀. 52, Nigerian specimen ♀. 53, Rhodesian specimen ♂. 54-56, Zaire specimen ♀, ♂, ♂.

ptg.]. Paralectotype of *hebetatus*, 1 ♀ with 'Caia H. Swale/Type [pink label ptg.]/*S. hebetatus* Grouv. ty', MNHN, Paris.

Lectotype of *quadraticollis* Reitter, present designation, sex indet., length 2.37 mm, with 'Madagascar Rollenberg/*quadraticollis* m. Madagas [Reitter's MS]/*quadraticollis* Rtt/Ex Coll. Reitter'. There is no type-material of this species in the TM, Budapest. The above specimen is in the Oberthür collection, MNHN, Paris.

COMPARATIVE NOTES. Closely related to *proximus*. In addition to characters given in the key, the following are useful in distinguishing *inarmatus* from *proximus* (i) usually more elongate, (ii) eyes less prominent, (iii) base of pronotum comparatively broader, (iv) pronotum with posterior angles nearly right-angles and raised dorsally, whereas in *proximus* they are obviously obtuse and not raised and (v) elytra obviously depressed and slightly more elongate.

DISTRIBUTION. Ethiopian. CAPE VERDE IS: S. Iago (types); GUINEA: N'Zérékoré; IVORY COAST: Tonkoui; GHANA: widely distributed; TOGO: Mt Togo, Klouto 800 m; NIGERIA: Ile-Ife and 'Nigeria'; CAMEROUN: Victoria; GABON: Pointe Noire; ZAIRE: widely distributed (reference numbers of specimens collected in the Parc National de la Garamba (see p. 43) 2208, 2841, 2918, 2930, 3519, 3738, 3774, 3823, 2932, 4007); ANGOLA: Baia Farta, Camaxilo and Dundo; UGANDA: Ruwenzori Range, Semliki Forest; KENYA: Ikutha, Kijabe and Ramisi; TANZANIA: 52 mls N.E. Iringa and Neu Moschi; MOZAMBIQUE: Caia (types of *hebetatus*); SEYCHELLES; MADAGASCAR (type-locality of *quadraticollis*): Maroantse-tra-ville and Ambodiwagy; ZAMBIA: Shigariatombwes and Mwingwa; RHODESIA: Matabeleland; SOUTH AFRICA: Cape Province and Transvaal nr Messina. In BMNH, London; CAS, California; IRSNB, Brussels; IFAN, Dakar; MD, Dundo; MF, Munich; MNHN, Paris; MRAC, Tervuren; TM, Budapest.

HABITATS. Occurs sporadically in association with stored products of African origin – probably often as a cross-infestation from dunnage. It has been collected at light, on maize heads (several records), fruits and under bark of *Ficus* and there are many records from beneath bark or associated with dead branches of various trees.

Silvanus proximus Grouvelle

(Text-figs 46, 48, 50)

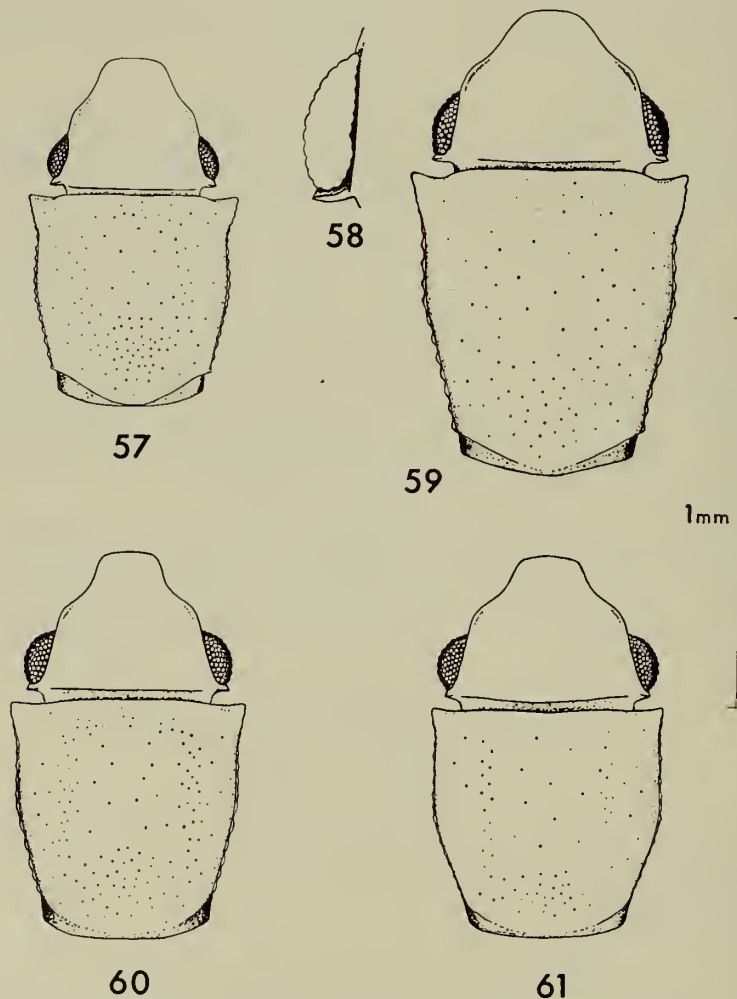
Silvanus proximus Grouvelle, 1904 : 183. LECTOTYPE ♂ here designated, see below), CAMEROUN (MNHN, Paris) [examined].

Silvanus amabilis Grouvelle, 1914 : 140. Holotype, sex indet., ZAIRE (MRAC, Tervuren) [examined]. **Syn. n.**

Length 1.83–2.39 mm. *Head* a little broader than long (11.3–11.8 : 10) slightly narrower across eyes than pronotum across anterior angles (10 : 10.6–10.9); dull, puncturation similar to *inarmatus* but margins of setiferous punctures raised, producing a more rugose appearance; eyes large, prominent; temples acute, about as long as an eye-facet. *Pronotum* (Text-fig. 46) slightly longer than broad (10.7–11.5 : 10), sides moderately convergent to posterior angles; appearance dull, puncturation as in *inarmatus*; anterior angles more or less acute, disc depressed

at base and slightly towards apex; posterior angles obtuse, not raised dorsally, ratio of breadth of pronotum across posterior angles to that across elytral humeri (10 : 14.9-15.7); *prosternal process* narrowly grooved between coxae, where breadth is half of apical breadth (Text-fig. 50). *Elytra* 1.83-1.96 times as long as broad, convex in section (disc not depressed) puncturation and setation as in *inarmatus*; epipleuron, by junction of abdominal sternites 4 and 5, becoming abruptly more tapered and declivous to apex, more or less absent apically, the elytral apex produced and often forming a distinct tooth (Text-fig. 48). *Legs*. Metafemur and metatibia in ♀ simple; in ♂ metafemur with a low ridge on basal half of anterior margin and metatibia with a row of spinules on posterior margin.

Number seen: 245.



FIGS 57-61. *Silvanus*, head and pronotum. 57, *S. unidentatus* (Olivier). 58-59, *S. planatus* Germar. 58, Eye. 60-61, *S. nitidulus* LeConte. 60, Specimen from Maryland. 61, Specimen from Arizona.

Lectotype, present designation, ♂, length 2.12 mm, with 'Albrechts-Höhe Cameroun [MS violet ink on blue paper]/Type [MS violet ink on white paper]/proximus Grouv.', all Grouvelle's MS. One paralectotype ♂ with same data as lectotype, also in MNHN, Paris. Syntypes from ZAIRE, 'Kinchassa (Waelbroek)' were not found.

COMPARATIVE NOTES. This species is very similar to *inarmatus* and the Palearctic *unidentatus*. It may be distinguished from *inarmatus* as described in the key and 'Comparative notes' for that species. It has larger eyes, denser puncturation on the clypeus and frontal triangle, pronotum with less convergent sides and shorter, more acuminate elytra than in *unidentatus*.

DISTRIBUTION. Ethiopian and apparently introduced to the Neotropical region. GUINEA: Mt Nimba; SIERRA LEONE; IVORY COAST: Tonkouï; GHANA: widely distributed; CAMEROUN (type-locality); GABON; ZAIRE (type-locality for *proximus* and *amabilis*): widely distributed; SOUTH WEST AFRICA: nr Outjo; TANZANIA: Neu Moschi, recorded by Grouvelle (1923), specimens examined, and Lake Manyara. Ethiopian material in BMNH, London; CAS, California; IFAN, Dakar; IRSNB, Brussels; MNHN, Paris; MRAC, Tervuren; TM, Budapest. MEXICO: Tres Zapote (in USNM, Washington); VENEZUELA: Caracas (in ZM, Berlin); BRAZIL (see below, in PICL Slough); WEST INDIES: St. Thom[as Is.], Martinique and Grenada (in ZM, Berlin and BMNH, London).

HABITATS. Occurs occasionally in association with stored products imported to Britain from Africa and one specimen was found on brazil-nut residues in a ship carrying nuts from Belon, Brazil. It has been sifted from oil-palm fruits, *Elaeis* (Congo 106 specimens, Ghana 98 specimens), caught at light and found in humus and forest-litter.

Silvanus nitidulus LeConte sp. rev.

(Text-figs 60, 61)

Silvanus nitidulus LeConte, 1854: 78. LECTOTYPE (here designated, see below), U.S.A.: California (MCZ, Massachusetts) [examined]. [Regarded as synonymous with *Silvanus planatus* Germar by Hetschko, 1930.]

Length 2.06–2.59 mm. This is a small and extremely variable species. It appears to represent a polytypic species in the sense of Mayr, Linsley & Usinger (1953). The extreme forms (specimens seen from Arizona and Maryland) are distinct and may be separated by using characters provided by the form of the pronotum and the puncturation of the head, but intermediate forms exist (specimens seen from Central Mexico and Utah). *Head* broader than long (12.6–14.5 : 10), slightly to obviously narrower across eyes than pronotum across anterior angles (10 : 10.2–11); puncturation on clypeus and frontal triangle extremely variable, sparser than in *planatus*: either puncturation fine, predominantly setiferous, punctures separated by 4–5 diameters, interspaces with strong reticulation (Arizona and California specimens) or at the other extreme less predominantly setiferous, finer and coarser simple punctures also present and consequently puncturation denser, interspaces with ill-defined to moderately distinct reticulation; eyes rather flat (Text-fig. 60, Maryland) to prominent (Text-fig. 61, some specimens from Arizona), ratio of length to breadth, 2.8–2.4 : 1; temple as long as 1–1.5 eye-facets. *Pronotum* variable, extreme forms illustrated in Text-figs 60, 61, longer than broad (10.4–

11.3 : 10); anterior angles feebly developed to almost absent (Arizona and C. Mexico specimens); disc depressed and with a narrow, longitudinal, slightly raised, sparsely punctured region in the middle; sides with strong rugose puncturation; posterior angles absent, sides rounded to base; basal margin ill-defined. *Elytra* 2.1-2.2 times as long as broad, strial puncturation not quite as deep as in *planatus*. *Legs* in ♀ simple, in ♂ metatibia with a row of very small spinules on posterior margin, metafemur simple. *Genitalia* ♂, similar to *planatus*.

Number seen: 150.

Lectotype, present designation, sex indet., length 2.19 mm, with a gold card disc and 'Type 6775 [red label]/*S. nitidulus* Colorado Lec'. LeConte gives 'Colorado River California under poplar bark' as the type-locality but no indication of the number of specimens he had before him when describing the species. I am assuming that 'Colorado' stands for Colorado River.

COMPARATIVE NOTES. This species is closely related and similar to *planatus*, a species with which it has been synonymized (Hetschko, 1930 etc.) and the general facies of some specimens may lead to confusion with *unidentatus*. It can be distinguished from *planatus* by its pronotal form, particularly the lack of posterior angles, smaller size and comparatively sparser puncturation on head, prosternum and mesosternum.

DISTRIBUTION. Nearctic: CANADA, U.S.A. and CENTRAL AMERICA. Alberta: Medicine Hat; California: Davis, Red Bluff, Kern Co. (USNM, Washington); Utah: Roesmith, N. Logan (USNM, Washington); Colorado: Littleton; Arizona: Tacna (40 ex.), Tucson (USNM, Washington), Benson, Cibola, Globe; Nebraska: Lincoln (35 ex.), Malcolm; Iowa: Iowa City, Independence; Kansas: Onagra, Wathena (USNM, Washington); Oklahoma: Cleveland Co; Texas (BMNH, London); New York: Pelham (USNM, Washington); Pennsylvania: Darby; Maryland: nr Plumer Is, Washington Co., Clear Springs (USNM, Washington), Takoma Park; CENTRAL MEXICO (USNM, Washington). Unless stated otherwise, specimens are in CAS, California.

Silvanus planatus Germar

(Text-figs 22, 58, 59)

Silvanus planatus Germar, 1824 : 466. Type(s), NORTH AMERICA [not examined].

Silvanus zimmermanni Guérin-Méneville, 1844 : 198. Type(s), U.S.A.: Carolina [not examined]. [Syn. teste Leng, 1920 : 198, etc.]

Silvanus cognatus LeConte, 1854 : 77. LECTOTYPE (here designated, see below), U.S.A.: Georgia (MCZ, Massachusetts) [examined].

Length 2.31-2.82 mm. Ventral surface strongly shining. *Head* broader than long (12.7-13.9 : 10), narrower than pronotum (ratio of breadth across eyes to that across pronotal anterior angles 10 : 11.6-11.8); clypeus and frontal triangle, which extends to back of head, very unevenly punctured (punctures separated by 2-5 diameters, mainly setiferous), interspaces strongly shining; sides of head with dense puncturation, rugose by eyes; eye and temple as in Text-fig. 58, eyes rather flat, usually obviously elongate (2.9-2.6 times as long as broad); temple as long as 1-1.5 eye-facets. *Pronotum* longer than broad (11.0-11.8 : 10), form similar to that in *unidentatus* but frequently more obviously depressed and anterior angles usually more tapered to apex (Text-fig. 59); puncturation dense but often with a more sparsely punctured region along mid-line, interspaces strongly shining; disc slightly depressed towards

base; posterior angles obvious. *Elytra* 2·13–2·24 times as long as broad, similar to *unidentatus* except as described in 'Comparative notes' below. *Abdominal sternites* with coarse setiferous punctures separated by 1–2 diameters. *Legs* in ♀ simple; in ♂, metatrochanter with a prominent spine, metafemur with a lamellate ridge traversing median third of ventral side, metatibia with a row of spinules on posterior margin. *Genitalia* ♂, Text-fig. 22.

Number seen: 194.

Lectotype of *cognatus* LeConte, present designation, sex indet., length 2·71 mm, bearing an orange disc and 'Type 6776 [red label]/*S. cognatus* Ga Lec'.

COMPARATIVE NOTES. This species is very similar to the American *nitidulus* and Palaearctic *unidentatus*. For the former species see 'Comparative notes'. In addition to the ridge and eye character which is sometimes difficult, the abdominal puncturation and the shining appearance of *planatus* (see key), the following comparative characters may be used to distinguish it from *unidentatus*: (i) antennal segment 10 (second club-segment) more transverse; (ii) pronotum more depressed, and when present, impunctate area may be much broader than 1–2 punctures; (iii) prosternal process behind procoxa comparatively broader; (iv) elytra more acuminate, striae punctures slightly larger and deeper; and (v) in ♂, metatrochanter with a spine, and ridge on metafemur less prominent.

DISTRIBUTION. Nearctic. CANADA: Ontario, Quebec and 'Canada W' (in BMNH, London). U.S.A.: Iowa, Illinois, Kansas, Oklahoma, Arkansas, Texas, Louisiana, Michigan, Indiana, Ohio, New Hampshire, New York, Pennsylvania, Virginia, Maryland, New Jersey, Tennessee, N. Carolina, Alabama, Georgia, S. Carolina, Florida. In CAS, California, USNM, Washington etc. Hatch (1961) includes Washington, Idaho and Oregon.

HABITATS. Under bark of various trees including *Castanea*, *Quercus*, *Acer* and *Populus*.

Silvanus unidentatus (Olivier)

(Text-fig. 57)

Ips unidentata Olivier, 1790 : 9. Type(s), FRANCE: near Paris [not examined].

Colydium planum Herbst, 1797 : 285. Type(s), GERMANY [not examined]. [Syn. teste Erichson, 1846 : 338.]

Silvanus unidentatus (Olivier) Latreille, 1804 : 158.

Silvanus graciosus Motschulsky, 1863 : 501. Type(s), CEYLON: near Colombo [not examined]. [Syn. teste Reitter, 1880b : 509].

Silvanus siculus Stierlin, 1864 : 147. Type(s), SICILY [not examined]. [Syn. teste Hetschko, 1930 : 63.]

Length 2·10–2·90 mm. Ventral surface rather dull. *Head* broader than long (12·4–12·7 : 10), much narrower than pronotum (ratio of breadth across eyes to that across anterior pronotal angles, 10 : 11·2–12·0); clypeus and frequently frontal triangle, which extends to middle of head, rather sparsely punctured (clypeal punctures mainly setiferous and separated by 3–5 diameter), interspaces moderately shining; rest of head comparatively dull, with dense coarse punctures and finer setiferous punctures on their interspaces, particularly coarse and dense by eyes; eye and temple as in Text-fig. 57, eyes small, comparatively flat about 3 times as long as broad, length no greater than distance from eye to clypeogenal emargination, one quarter to one third length of head, eyes separated dorsally by about four times their length;

temples as long as 1-2 eye-facets. *Pronotum* (Text-fig. 57) a little longer than broad (11 : 10), general appearance rather dull; puncturation dense, disc slightly less densely punctured than sides and often with a longitudinal narrow impunctate mid-line (breadth equivalent to 1-2 punctures); anterior angles as in Text-fig. 57 or slightly less pronounced; disc shallowly depressed on basal third, basal margin ill-defined medially. *Elytra* 2.17-2.24 times as long as broad, interstriae flat, striae punctures about 1.5 times as broad as an eye-facet, fine setiferous punctures on interspaces and interstriae tuberculate but not obviously so at low magnification. *Abdominal sternites* 2-5 with fine setiferous punctures separated by 2-5 diameters. *Legs* in ♀ simple, in ♂ metatrochanter without a distinct prominence; metafemur with a prominent lamellate ridge on apical two-sevenths of ventral side and metatibia with a row of spinules on posterior margin. *Genitalia* ♂, similar to Text-fig. 22 but often with median lobe more strongly tapered to apex.

Number seen: 300.

COMPARATIVE NOTES. The name *unidentatus* has been erroneously applied to many species and non-Palaeartic specimens labelled '*unidentatus*' should be carefully checked. *S. unidentatus* is most closely related and similar to the Nearctic *planatus* and *nitidulus*. For comparison with *planatus* see notes for that species. It may be distinguished from *nitidulus* by pronotal characters as follows: puncturation denser, anterior angles usually moderately developed (in *nitidulus* they are usually poorly developed), sides more sinuate and convergent to base, and posterior angles obvious. In addition to these characters, *unidentatus* is comparatively dull and has a narrower antennal club. From other related African species, *proximus*, *inarmatus* and *mediocris*, it is readily distinguished by the form of its eyes, head and pronotum.

DISTRIBUTION. Palaeartic. FENNOSCANDIA as far north as 67° lat., (Lindroth, 1960); EUROPE (fairly common locally in southern England, scarce in the Midlands and until recently not found further north than Yorkshire; Crowson (1962) found one specimen under bark in Kirkcudbright, Scotland); MEDITERRANEAN; and specimens have been seen from as far east as Burnaul in U.S.S.R., from Manchuria, CHINA, and one specimen in the TM, Budapest was collected in KOREA. It has been introduced to the U.S.A., specimens have been examined from California (CAS, California), Utah (USNM, Washington and CAS, California), Illinois and Pennsylvania (both in CAS, California) and New Jersey (USNM, Washington and CAS, California). There is a series of specimens from Angol, CHILE in USNM, Washington but published records from Grenada (Champion, 1898) have not been confirmed and may refer to *proximus*. Good series of *unidentatus* are held by most European museums.

HABITATS. Found under bark of various deciduous trees, e.g. *Fagus*, *Quercus*, *Carpinus* etc.

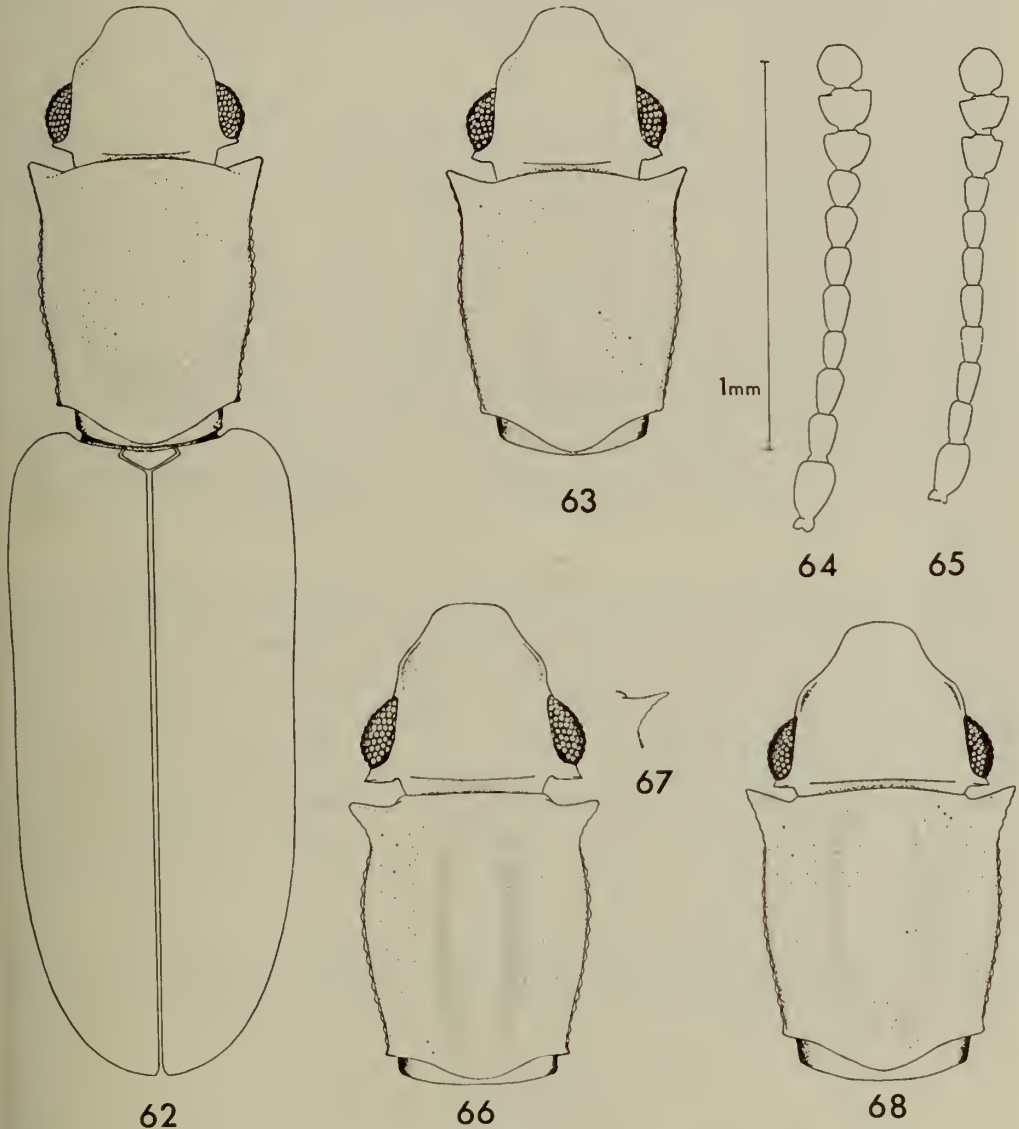
Silvanus castaneus MacLeay

(Text-fig. 62)

Silvanus castaneus MacLeay, 1873 [read 1871, published 1873] : 168. Holotype ♀, AUSTRALIA (MacLeay Museum, Sydney) [examined].

Length 2.31-2.97 mm. *Head* broader than long (12.6-13.0 : 10), narrower than pronotum (ratio of breadth across eyes to that across pronotal anterior angles, 10 : 11.6-11.7); frontal

triangle with relatively small discrete punctures, interspaces shining; sides of head comparatively dull, puncturation denser than on frontal triangle, not obviously ocellate (frequently the puncturation of the head is partly hidden by the golden decumbent setae); genal margin not obviously raised; eye 2.3–2.5 times as long as broad, separated from clypeogenal emargination by 0.70–0.72 diameter; temple as long as an eye-facet. *Pronotum* (Text-fig. 62) longer than broad (12.7–13.2 : 10), dull with coarse, dense, rather shallow puncturation; anterior



FIGS 62–68. *Silvanus*. 62, *S. castaneus* MacLeay. 63, *S. lateritius* (Broun) head and pronotum. 64, Antenna of *S. bidentatus* (F.). 65, Antenna of *S. muticus* Sharp. 66–67, *S. bidentatus* (F.). 66, Head and pronotum. 67, Variant of anterior angle of pronotum. 68, *S. muticus* Sharp, head and pronotum.

angles with sides more or less straight (Text-fig. 62) may be more or less prominent laterally than illustrated, gradually developed from side of pronotum, very slightly produced anteriorly beyond anterior margin; disc usually with a deep, broad depression, particularly strong towards base, where its derivation from two lateral foveae is often apparent; posterior angles almost right-angles. *Elytra* 2.3 times as long as broad; ratio of breadth across humeri to that across pronotal posterior angles, 13.7-14.5 : 10, rounded to apex as in Text-fig. 62. *Ventral surface* shining, interspaces may be reticulate. *Legs* in ♀ simple, in ♂ metatrochanter with a tubercle towards apex, femur with a lamellate ridge traversing ventral side from basal quarter of posterior margin to mid-line at apical half, tibia with a row of spinules on posterior margin.

Number seen: 100.

I am accepting the specimen in the MacLeay Museum, Sydney with 'Gayndah [ptg.]/*Silvanus castaneus*, MacL. Gayndah [MS]', a ♀, as the holotype. The original description gives a single measurement for length of the species. There is no other indication of the number of specimens seen by MacLeay.

COMPARATIVE NOTES. *S. castaneus* has been confused with *unidentatus* and *lateritius* (Broun), species from which it may be distinguished by the general facies of head and thorax. In some specimens of *lateritius* the discal depression on the pronotum is almost identical with that of *castaneus* and as this species is often found with *castaneus* in Australia, the following comparative characters should prove useful: in *castaneus* (1) puncturation of the frontal triangle different from that at the sides of the head; (2) anterior angles of pronotum with more or less straight sides, less acute; (3) prosternal process without a distinct depression towards base and not obviously channelled between coxae; and (4) elytra slightly less acuminate to apex.

DISTRIBUTION. Oriental and Australian. SINGAPORE: Seletar; (imported from SARAWAK? to Britain); AUSTRALIA: Western Australia - Geraldton, Sir Graham Moore Is, National Park Upper Ord River and Perth; Northern Territory - Damma Is, Groote Eylandt, Melville Is and Port Darwin; Queensland - Brisbane, Cairns, Cardstone, Coen River, Cootha Mt., Dalby, Gayndah (type-locality), Glasshouse Mts, Goodna, Ingham, Kuranda, Magnetic Is, Rockhampton and Tambourine Mts; New South Wales - Curragong, Gundagai, Moree, Narrabri and Sydney; Victoria - Dandenong Ranges, Hamilton, Inglewood, Mallee district and Oyen; TASMANIA. In AM, Sydney; ANIC, Canberra; BMNH, London; Dr Brooks collection, Cairns; NMV, Victoria; PICL, Slough; QM, Queensland; SAM, Adelaide; TM, Budapest.

HABITATS. Found under bark and at light. Occasionally imported to Britain on illipe nuts from Indonesia and Singapore, one record on flour bags which were on top of a redwood consignment and another on a bag of rice, both from Australia.

Silvanus bidentatus (Fabricius)

(Text-figs 64, 66, 67)

Dermestes 2 dentatus Fabricius, 1792a : 233. Type(s), GERMANY (2 specimens in Kiel Fabrician collection, Zoological Museum, Copenhagen (Zimsen, 1964)) [not examined].

Colydium sulcatum Fabricius, 1792b : 555. Type(s), GERMANY (1 specimen in Kiel Fabrician

collection, Zoological Museum Copenhagen (Zimsen, 1964) [not examined]. [Syn. teste Erichson, 1846 : 338.]

Silvanus bidentatus (Fabricius) Sturm, 1826 : 196.

Silvanus affinis Reitter, 1876 : 58. LECTOTYPE ♂ (here designated, see below), JAPAN (BMNH, London) [examined]. **Syn. n.**

Silvanus bidentatus var. *affinis* Reitter; Reitter, 1880 : 509.

Length 2.54–3.49 mm. Dull. *Head* (Text-fig. 66) broader than long (11.8–12.3 : 10), narrower across eyes than pronotum across anterior angles (10 : 11.2–11.4); densely punctured with coarse punctures (as large or larger than eye-facets) and finer setiferous punctures, which may appear ocellate (similar to *lewisi*, Text-figs 1 and 5); clypeal region moderately shining, rest of head dull; genal margin raised forming a low triangular prominence; antennae as in Text-fig. 64; eye moderately prominent 2–2.5 times as long as broad, separated from clypeo-genal emargination by 0.65–0.74 times their length; temple as long as two eye-facets or slightly shorter (eye diameter to temple ratio, 4.5–7.4 : 1.0). *Pronotum* (Text-fig. 66) longer than broad (12.9–13.3 : 10), puncturation as on vertex of head; anterior angles rather abruptly developed from side of pronotum, strongly produced laterally, sometimes very fine (Text-fig. 67), not produced anteriorly beyond anterior margin; disc with deep lateral longitudinal foveae, well-defined from base to apex; posterior margin ill-defined medially; disc of *metasternum* and *abdominal sternites* 1 and 2 depressed (depression extending from anterior third of metasternum to posterior half of sternite 2, deepest in ♂). *Elytra* 2.1–2.2 times as long as broad, much broader across humeri than pronotum across posterior angles (15.4–16.2 : 10); striae punctures deep; interspaces and interstriae raised, approximately equal to breadth of striae punctures and with strongly tuberculate setiferous punctures (obviously tuberculate at low magnification). *Ventral surface* dull, tuberculate and interspaces reticulate throughout. *Legs* in ♀ simple, in ♂ metatrochanter with a small but prominent spine and metafemur bearing a moderate ridge on basal third of ventral side (without spinules on tibiae).

Number seen: 100+.

Lectotype of *affinis* Reitter, present designation, ♂, length 2.88 mm, 'Type H.T. [ptg., circular red-bordered label]/Matsu rare [green label]/Japan G. Lewis 1910–320/*Silvanus affinis* in Japan [MS]'. Paralectotype, on the same card as the lectotype (left hand specimen), ♀, length 3.27 mm.

COMPARATIVE NOTES. This species is extremely closely related and similar to *muticus*, see comparative notes for the latter. The species *lateritius* of Broun was erroneously synonymized with *bidentatus*, although differences between these species are obvious. The deep well-defined lateral foveae distinguish *bidentatus* from all species except *muticus*.

DISTRIBUTION. Palearctic and introduced elsewhere. FENNOSCANDIA, most northern record c. 66° N (Lindroth, 1960). EUROPE (rare in Britain, where it has been recorded from Renfrewshire, Northumberland, Cheshire, Berkshire, Surrey, Essex and Kent (Allen, 1956); Allen suggests that there may have been a recent extension of its range in Britain and that originally it may have been introduced). It is recorded as rare in European RUSSIA (Kryzhanovskij, 1965). It occurs in JAPAN, from where it was first described as a new species, *Silvanus affinis*, by Reitter. *S. bidentatus* has been introduced to CANADA and the U.S.A., specimens in USNM, Washington and CAS, California were collected in the following states: British Columbia, California, Colorado, Wisconsin, Texas, New Hampshire, New York, Massachusetts, Pennsylvania and New Jersey. Other localities represented by single specimens in the BMNH, London are ST PAUL ROCKS (Mid Atlantic),

HAWAIIAN IS, INDIA and in the CAS, California, THAILAND. Examples of this species may be found in most European Museums.

HABITATS. Although this species is said to be found beneath the bark of pine (*Pinus*) in Europe, it has been discovered under bark of *Fagus* and *Quercus* in Britain. Recently, living *S. bidentatus* were found on dunnage in a ship carrying flour and wheat from Canada to England.

Silvanus muticus Sharp

(Text-figs 65, 68)

Silvanus muticus Sharp, 1899 : 560. Holotype sex indet., GUATEMALA (BMNH, London) [examined].

Length 2.52–3.20 mm. General facies and puncturation (including elytral striation) similar to *bidentatus*. Head broader than long (11.7–13.3 : 10), narrower across eyes than pronotum across anterior angles (10 : 10.8–11.9); antennae as in Text-fig. 65; eyes moderately prominent, 2–2.5 times as long as broad, separated from clypeogenal emargination by 0.62–0.83 times their length; temple as long as 0.5–1.0 times eye-facet (eye diameter to temple ratio, 10.5–17.6 : 1.0). Pronotum (Text-fig. 68) longer than broad (12.3–13.0 : 10); anterior angles gradually developed from side of pronotum, slightly produced anteriorly beyond anterior margin; discal foveae similar to those of *bidentatus* but usually shallower; metasternal disc shallowly depressed on posterior two-thirds or in ♂ on whole of disc, discs of abdominal sternites 1 and 2 often shallowly depressed, particularly in ♂. Elytra 2.0–2.1 times as long as broad, broader across humeri than pronotum across posterior angles (15.0–15.5 : 10). Legs in ♀ simple; in ♂ metatrochanter with a low ridge and usually an ill-defined spine, metafemur with a prominent ridge on basal third of ventral side.

Number seen: 350.

COMPARATIVE NOTES. This American species is extremely close to the Palaearctic *bidentatus* and although recognized as distinct by Sharp (1899) (type-locality Guatemala), it continued to stand under '*bidentatus*' in American (and other) collections. *S. bidentatus* appears to be comparatively rare in the U.S.A. It may be distinguished from *bidentatus* as follows: antennae less robust, segments 3–8 slightly more elongate (see Text-figs 64, 65), temples narrower; anterior angles of pronotum gradually developed (not abruptly developed as in *bidentatus*), foveae of thorax usually shallower; in ♂ a more prominent ridge on metafemur and a much less prominent tooth (if present) on metatrochanter.

DISTRIBUTION. Nearctic and Neotropical. CANADA: Montreal (1 ex.). U.S.A.: California, Wisconsin, Iowa, Illinois, Kansas, Arkansas, Texas, Louisiana, Michigan, Ohio, New Hampshire, New York, Massachusetts, Pennsylvania, W. Virginia, Virginia, Maryland, New Jersey, Tennessee, N. Carolina, Alabama, Georgia, S. Carolina, Florida. GUATEMALA (type-locality – only holotype seen from Guatemala). In CAS, California, and USNM, Washington.

HABITATS. Found associated with various trees, usually beneath bark (records include *Pinus*, *Acer*, *Quercus*, *Castanea*, and *Juniperus*) and at light.

Silvanus robustus sp. n.

(Text-figs 23, 75-77)

Length 2.53-2.98 mm. Dorsal puncturation similar to *difficilis*. Head a little broader than long (10.5-11.2 : 10), narrower across eyes than pronotum across anterior angles (10 : 10.7-11.6); genal margin moderately to strongly raised eyes separated ventrally by 2-2.4 breadths (not as large as usual for *difficilis*); temples as long as 1.5-2 eye-facets, ratio of temple-length to eye-length, 1 : 7.4-8.2; antennal club segments rather quadrate, club appearing elongate (Text-fig. 77). Pronotum (Text-fig. 75) usually moderately gibbous, longer than broad (13.6-13.9 : 10); sides not distinctly sinuate before posterior angles; disc with a shallow to moderate depression towards base; prosternum with prominent shining tubercles. Elytra 2.1-2.2 times as long as broad, similar to *lewisi*, margins obviously explanate. Legs in ♀ simple; in male, metatrochanter with a prominent tubercle, metafemur with a distinct ridge on anterior margin, metatibia with a row of spinules on posterior margin (Text-fig. 76). Genitalia ♂, median lobe and paramere (Text-fig. 23).

Holotype ♂, length 2.83 mm, MALAYA: Johore, Layang, light trap in oil palm estate, 30.v.69 (*D. H. Murphy*) (BMNH, London).

Paratypes (8). 1 ex., MALAYA: Johore, S. Kahang estate, light trap (*J. R. Pippet*) (PICL, Slough); 2 ex., SINGAPORE: 1898 (*Biro*) (TM, Budapest); 1 ex., JAVA: Buitenzorg (*E. Csiki*) (TM, Budapest); 1 ex., Soekaboemi (*Mrs Walsh*) (BMNH, London); 1 ex., SARAWAK: Sibuluan, from dried illipe kernels, 1968 (*M. Connell*) (BMNH, London); 1 ex., Sibuluan, 1968 (*M. Connell*) (PICL, Slough); 1 ex., PHILIPPINES: Basilan (*F. Nevermann*) (USNM, Washington).

COMPARATIVE NOTES. This species is closely related to *difficilis* and certain specimens of *robustus* look very similar to it, e.g. those from Singapore (TM, Budapest). Most specimens are easily distinguished by the gibbous pronotum but in some this is poorly developed. The lack of distinct lateral and apical depressions on the pronotal disc and the more elongate antennal club may be used to distinguish *robustus* from *difficilis*. Additional characters are provided by the eyes, which are usually smaller in *robustus*, the side of the pronotum, which is obviously sinuate before the posterior angles in *difficilis* and size, *robustus* being the larger species.

DISTRIBUTION. Oriental; Malaya, Singapore, Java, Sarawak and Philippines.

HABITATS. Two of the types were collected at light and one on illipe nuts.

Silvanus lateritius (Broun) sp. rev.

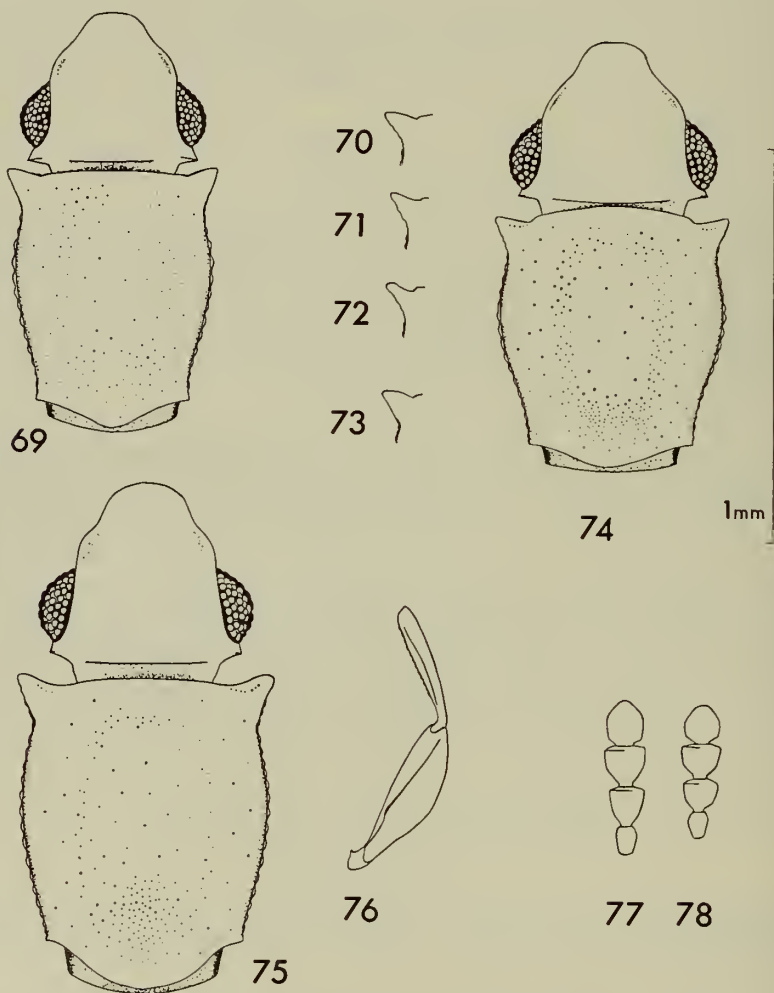
(Text-fig. 63)

Cryptamorpha lateritia Broun, 1880 : 222. LECTOTYPE (here designated, see below), NEW ZEALAND (BMNH, London) [examined]. [Regarded as synonymous with *Silvanus bidentatus* (F.) by Walker 1912 : 18.]

Length 2.47-2.84 mm. Head broader than long (12.0-12.6 : 10), narrower across eyes than pronotum across anterior angles (10 : 11.7); head rather dull, everywhere densely and coarsely punctured, setiferous punctures appearing ocellate (similar to *lewisi*, Text-fig. 1); genal margin slightly raised; eye 2.2-2.5 times as long as broad, separated from clypeogenal emargination by 0.68-0.74 diameter, separated ventrally by 2.3-3.7 breadths; temple longer than an eye-facet (1.0-1.5 eye-facet diameters). Pronotum (Text-fig. 63) longer than broad (12.9-13.5 : 10),

puncturation as on head; anterior angles moderately acute as in Text-fig. 63, sometimes more prominent and narrower than illustrated, slightly produced anteriorly beyond apex of anterior margin; disc moderately to strongly depressed, bearing weak lateral foveae which fuse towards base; posterior angles obtuse. *Elytra* 2.2–2.3 times as long as broad; ratio of breadth across humeri to that across posterior angles of pronotum, 14.8–16.1 : 10, margins very narrow for basal two-thirds, not explanate, slightly broader towards apex moderately acuminate to apex. *Sternites* rather dull, puncturation of prosternum coarse, dense and tuberculate towards sides. Metasternal disc slightly depressed. Disc of abdominal sternites 1 and 2 depressed in ♂, more or less flat in ♀. *Legs* with secondary sexual characters as in *castaneus*.

Number seen : 60.



FIGS 69–78. *Silvanus*. 69–74, *S. difficilis* sp. n. 69, New Guinea form, head and pronotum. 70–73, Variants of anterior angle of pronotum – specimens from: 70, Singapore; 71, New Guinea; 72, Java; 73, Vietnam; 74, Normal form, head and pronotum, specimen from Sarawak. 75–77, *S. robustus* sp. n. 75, Head and pronotum. 76, Hind leg of ♂ (less tarsus). 77, Antennal segments 8–11. 78, *S. difficilis* sp. n., same.

Broun (1880) in his description states 'I found one specimen mutilated under bark of *Leptospermum* at Tairua, some years ago, and three others recently near Whangarei Heads, under Rimu bark.' In the BMNH, London there are two specimens labelled 'Tairua [ptg.]' and one of these has its right anterior pronotal angle broken. I am accepting this specimen as the lectotype. The authenticity of the labelling of the other specimen is questionable. The material from Whangarei is not in the BMNH, London nor in the collection of the DSIR, Auckland.

Lectotype, present designation, sex indet., length 2.93 mm, with '390/Tairua/New Zealand Broun Coll. Brit Mus 1922-482'.

COMPARATIVE NOTES. This species is similar to *castaneus* (see comparative notes for *castaneus*), *difficilis*, *robustus*, the American *muticus* and was placed in synonymy with *bidentatus*. It can be distinguished from *robustus* by the form of its antennal club, the narrow elytral margins and its eyes, which are usually smaller. Similarly the smaller eyes of *lateritius* distinguish it from *difficilis*; also the form of the pronotum is diagnostic. *S. muticus* has broader elytra (1 : 2.0-2.1) which are more strongly tapered to their apices than in *lateritius*, etc. The pronotum with gradually developed anterior angles and weak lateral foveae is quite different from that of *bidentatus* and the head-form with shorter temples is also distinct.

DISTRIBUTION. Australian (including New Zealand) and probably introduced to South Africa, Madeira and Hawaiian Is. AUSTRALIA: Western Australia - National Park Upper Ord River; Queensland - Brisbane, Cairns, Crystal Creek, Southport and Tambourine Mts; New South Wales - Clarence Town, Cumberland, Gundagai, Hornsby, Mundarlo, Sydney, Upper Willi'ms R' and Wahroonga; Victoria - Beaconsfield, Buchan, Dividing Range, Emerald, Inglewood, Noble Park, Orbost and Warburton; South Australia - Adelaide and Mt Lofty Range; TASMANIA: Franklin; NEW ZEALAND (type-locality): Auckland, Mt Albert, Owairaka, Waitakere Ranges (in coll., of DSIR, Auckland) and Glenhope (in BMNH, London); HAWAIIAN IS (2 ex., CAS, California), Cape Province, Ceres (1 ex., BMNH, London); MADEIRA (5 ex., BMNH, London, dated 1899). Australian specimens in AM, Sydney; AMC, Canberra; NMV, Victoria; SAM, Adelaide; PICL, Slough; QM, Queensland.

HABITATS. Found under the bark of *Eucalyptus*, 'under bark' and at light. Occasionally imported to Britain from Australia on sultanas etc., and one specimen found alive on cartons of canned peaches from Cape Town.

Silvanus difficilis sp. n.

(Text-figs 18, 69-74, 78)

Length 2.17-2.64 mm. Dull, brown to yellow-brown, represented in New Guinea by the normal form and by one which has long temples, the 'New Guinea form'. Head broader than long (10.8-11.9 : 10), narrower across eyes than pronotum across anterior angles (10 : 10.6-11.6); puncturation similar to *lewisi* but punctures on frontal triangle often appearing rather ocellate; eyes usually large but size variable, hence separated ventrally by 1.1-2.1 breadths and equal to one half or less of head-length; normal form: temples as long as 1-1.5 eye-facets,

ratio of temple-length to eye-length 1 : 7.0-10.5, 'New Guinea form': temples as long as 2-2.5 eye-facets, ratio of temple-length to eye-length 1 : 4.3-6.5 (Text-fig. 69); antennae broader than in *lewisi*, club as in Text-fig. 78. *Pronotum* longer than broad (12.4-13.4 : 10) more elongate than in *lewisi*; sides distinctly convergent to base as in Text-figs 69 and 74 or more so, obviously sinuate before posterior angles; puncturation coarse and dense, similar to that on head; anterior angles usually broader than in *lewisi* and not as strongly tapered to apex but variable (Text-figs 69-74); disc feebly depressed towards apex and at sides (sometimes with these depressions ill-defined) more strongly depressed at base; posterior angles greater than right-angles; *prosternum* with surface tuberculate and becoming rugose towards sides, surface of *metasternum* and 1st *abdominal sternite* similar but tubercles slightly smaller. *Elytra* 2.0-2.1 times as long as broad, similar to *lewisi*. *Legs* in ♀ simple, in ♂ metatrochanter with a low ridge forming a weak protuberance; metafemur with a ridge from basal quarter to half of anterior margin; metatibia with a row of spinules along posterior margin. *Genitalia* ♂, median lobe and paramere, Text-fig. 18.

Holotype ♂, length 2.34 mm, MALAYA: Keruing, 30.ii.1933 (*R. C. Fisher*) (BMNH, London).

Paratypes (109 normal form and 34 New Guinea form). Normal form. 1 ex., INDIA: Cinchona, Anamalai Hills, v. 1968 (ZM, Berlin); 1 ex., W. Almora Divn, Kumaun UP., xii. 1916 (*H. G. C[hampion]*); 1 ex., Kheri Forest, U.P., i. 1916 (*H. G. C[hampion]*); 1 ex., Kanara (*Andrews*), this and the previous 2 ex. in BMNH, London; 1 ex., Malabar coast, Mahè, 1901 (*Maindron*) (MNHN, Paris); 2 ex., Cochin, found on damp wood cases, M.A.F. Inf. Control H.Q. 266/54; 1 ex., CEYLON: on bags of desiccated coconut loaded Colombo, LIV 25/68; 2 ex., on Colombo tea, shed Tilbury docks, England, 15.iii.1965 (7995) 9824, in PICL; 1 ex., VIETNAM (NORTH): Hanoi, at light, 25.x.1963 (*T. Pocs*) (TM, Budapest); 1 ex., TAIWAN: Taihorin, 1911 (*H. Sauter*) (MNHN, Paris); 1 ex., MALAYA with same data as holotype, also in BMNH, London; 1 ex., Johore, S. Kahang Estate, ii. 1962 (*D. H. Murphy*) (PICL, Slough); 1 ex., Malaya (?) found in debris in hold of vessel on Malayan and Indonesian run, Malayan copra and palm kernels carried in holds, M.A.F. Inf. Control H.Q. 163/54 (PICL, Slough); 3 ex., Penang, xi. 1913 (*G. E. Bryant*) (BMNH, London); 1 ex., from SINGAPORE, imported on sago flour, M.A.F. Inf. Control H.Q. 119/55 (PICL, Slough); 1 ex., SUMATRA: Abjeh [?] (*L. G. E. Kalshoven*); 1 ex., Indargoan (*Verzon*) (MNHN, Paris); 4 ex., JAVA: Papandajan, 10.iv.1909 (*G. E. Bryant*) (BMNH, London); 6 ex., Batavia [Jakarta], 1898 (*Biro*) (TM, Budapest); 1 ex., Soekaboemi, 1916 (*Mrs Walsh*); 1 ex., Trisk [?], iii. 1930 (*L. Kalshoven*); 1 ex., Bogor, 29-30.iv. 1954 (*A. H. G. Alston*); 2 ex., CHRISTMAS Is, (Indian Ocean): i.iv.1933; 1 ex., 1939 (*Dr C. A. Gibson-Hill*), this and the previous 5 ex. in BMNH, London; 1 ex., SARAWAK: Semongok, 1st Div., in house, 29.ii.1968 (*M. Connell*) (PICL, Slough); 1 ex., Quop, 9.iii.1914 (*G. E. Bryant*); 3 ex., Mt. Matang, xii. 1913 (*G. E. Bryant*); 2 ex., BORNEO: Upper Kinabatang R., ii. 1950 (*J. K. Cox*), these and the previous 4 ex. in BMNH, London; 1 ex., PHILIPPINES: Basilan, x. 1930; 1 ex., Luzon, Los Banos, x. 1930; 1 ex., Mindanao, Kolombugan, x. 1930, this and the previous 2 ex. in USNM, Washington; 1 ex., MOLUCCAS: Makian (*Wallace*) (BMNH, London); 1 ex., NEW GUINEA (*Wallace*) (BMNH, London); 2 ex., New Guinea (*Biro*) (TM, Budapest); 15 ex., Hollandia, 20.x.1944 (*T. Aarons*) (CAS, California); 1 ex., Finschhafen, iv. 1944 (*E. S. Ross*) (CAS, California); 9 ex., Waing, ca 18 ml. 'of Lae', 13-14.iv.1965

(*Dr J. Balogh and Dr J. J. Szent-Ivany*) (TM, Budapest); 2 ex., Papua, Kokoda, 1,200', vii-viii. 1933 (*L. E. Cheesman*); 3 ex., Cyclops Mts, Sabron, 930', v. 1936 (*L. E. Cheesman*); 3 ex., Cyclops Mts, Sabron camp 2, 2,200', 15.v.1936 (*L. E. Cheesman*); 1 ex., Cyclops Mts, Sabron camp 1, 1,200', 15.v.1936 (*L. E. Cheesman*); 6 ex., Waigen camp 1, Mt. Nok, 2,500', v. 1938 (*L. E. Cheesman*); 1 ex., Waigen, Mt. Nok camp 2 (Buffelhorn), vi. 1938 (*L. E. Cheesman*), this and the previous 15 ex. in the BMNH, London; 1 ex., Boana Mission, Huon Pen, 900 m, 4.ix.1956 (*E. J. Ford*) (BPBM, Honolulu); 3 ex., I. DESLACS: 1901 (*Biro*) [off N. coast of NEW BRITAIN, part of VITU group] (TM, Budapest): 1 ex., SOLOMON IS: San Christoval, N.E. Wainoni, Huni River estuary, 9-12.viii.1965; 1 ex., Guadalcanal, Ilu Bush, 16.iii.1962 (*P. J. M. Greenslade*); 1 ex., Guadalcanal, Kukum, 9.xii.1965-13.i.1966 (*P. Greenslade*); 1 ex., SAMOAN IS.: Upolu, Malololelei, 2000', vi. 1924 (*P. A. Buxton & G. H. Hopkins*); 1 ex., Samoa, 1920 (*Dr H. Swale*), this and the previous 5 ex. in the BMNH, London; AUSTRALIA: 4 ex., Cairns district (*A. M. Lea*) (SAM, Adelaide); 2 ex., COSTA RICA: Hamburgfarm, Reventazon, Ebene Limon, ausgesägtern Holz, 1.xi.1934 (*F. Nevermann*); 1 ex., S. Jose, La Caja, v. 1932 (*H. Schmidt*), both in USNM, Washington; 1 ex.,? WEST AFRICA, on cargo matting on ship carrying W. African groundnut cake, logs etc., M.A.F. Inf. Control H.Q. 175/54 (PICL, Slough).

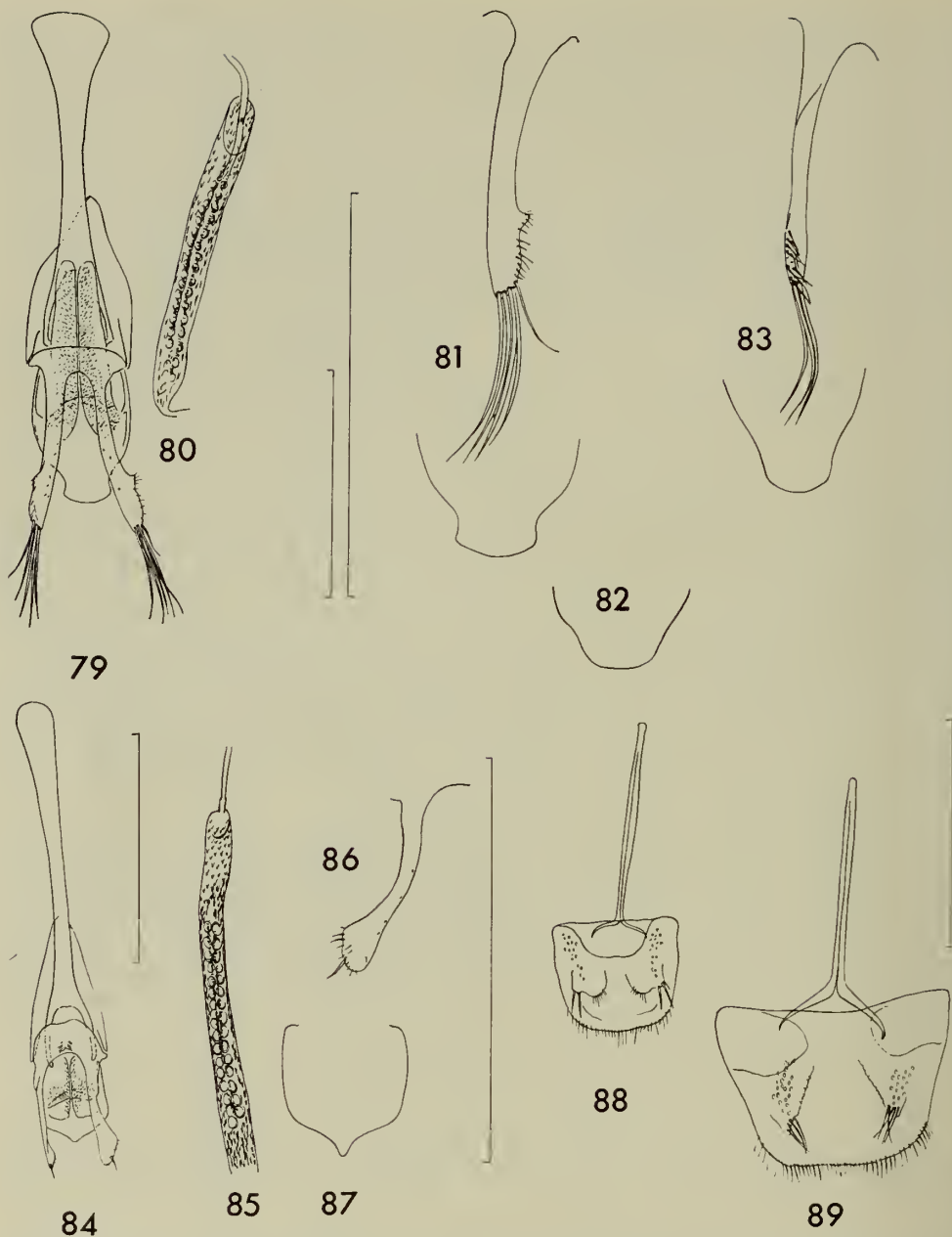
New Guinea form. 19 ex., NEW GUINEA: Waigen Camp I, Mt. Nok, 2500', v. 1938 (*L. E. Cheesman*); 3 ex., Waigen Mt., Nok Camp 2 (Buffelhorn) vi. 1938 (*L. E. Cheesman*); 8 ex., Waigen Camp, Nok, 2500', iv. 1938 (*L. E. Cheesman*), these and the previous 22 specimens in BMNH, London; 1 ex., NEW IRELAND: 12 km up Kait R., 240 m, 'Camp Bishop', 8.vii.1956 (*E. J. Ford*) (BPBM, Honolulu); 2 ex., AUSTRALIA: Cairns, Queensland, 26.i.38 (*Dr H. Brooks* Collection); 1 ex., Cairns District (*A. M. Lea*) (SAM, Adelaide).

COMPARATIVE NOTES. This extremely variable species contains some individuals which are similar to *robustus* others to *productus* and the large eyes may lead to confusion with *lewisi*. It may be distinguished from the latter species and *rossi* by the shape of the pronotum and the usually deeper lateral and apical depressions on its disc. The slightly less even and less recumbent setation and the broader temples also distinguish it from *lewisi*. See comparative notes regarding *robustus* and *productus*.

Grouvelle sometimes confused this species with *lewisi* and his *Silvanoprus* (*Silvanus* of Grouvelle) *birmanicus*.

DISTRIBUTION. Oriental, including N. Queensland of Australia and apparently introduced to Costa Rica; see data of type-series. The Australian specimens may have been imported on timber.

HABITATS. This species has been collected at light (Vietnam) on *Shorea robusta* (India) and it is found sporadically on commodities imported to Britain from the Oriental region and possibly on one occasion from Africa.



FIGS 79-89. 79-83, *Pensus* gen. n. 79-82, *P. gilae* (Casey). 79, Male genitalia. 80, Internal sac. 81, Paramere and apex of median lobe of 79, 82 apex of median lobe of another specimen. 83, *P. guatemalensis* (Sharp) paramere and apex of median lobe. 84-88, *Calpus bacchi* gen. et sp. n. 84, Male genitalia. 85, Internal sac. 86, Paramere. 87, Median lobe. 88, Sternites 8 and 9. 89, *Pensus gilae* (Casey) same. Scale lines = 0.4 mm.

PENSUS gen. n.

Type-species: *Silvanus gilae* Casey.

Number of species: 2.

Length 2.76–3.77. General facies of head and pronotum characteristic (Text-figs 90–94). This genus differs from *Silvanus* as follows: *Head* with ocellate setiferous punctures. *Antennae* more robust than usual for *Silvanus*, segment 6 obviously smaller than 7, which is about as broad as 9, segment 8 transverse and much shorter than segments 7 and 9, more obviously differentiated than in *Silvanus*, 9 and 10 forming a loose club with apical segment. *Eyes* rather small in comparison with most *Silvanus*; temples not longer than 1.5 eye-facets (in known species). *Thorax* with pronotum slightly to moderately elongate, with shallow depressions towards apex and/or base of disc; anterior and posterior angles well developed. *Legs* with tarsal segments slightly broader than in *Silvanus*, secondary sexual characters exhibited by ♂ as follows: metatrochanter with spine, metafemur with a long ridge, metatibia with a conspicuous row of spines on each margin, all tibiae more curved than in ♀. *Elytra* obviously explanate at sides in *gilae*; epipleura with a high vertical inner rim, broad, gradually tapered to near apex, then angled to it. *Genitalia* ♂, parameres with 3–5 very long apical setae and finer short setae towards apex (Text-figs 81, 83), not forked at apex; median lobe with a broad apex; ♂ abdominal sternites 8 and 9 as in Text-fig. 89.

DISTRIBUTION. Nearctic and Neotropical.

KEY TO THE SPECIES OF *PENSUS*

- 1 Head broader (breadth : length, 11.8–13.4 : 10); eye small with temple as long as 1–1.5 eye-facets; head and pronotum as in Text-figs 90, 91. Nearctic

gilae (Casey) (p. 77)

- Head narrower (breadth : length, 11.4–11.6 : 10); eyes larger with temples virtually absent; head and pronotum as in Text-figs 93, 94. Neotropical

guatemalenus (Sharp) (p. 79)

***Pensius gilae* (Casey) comb. n.**

(Text-figs 79–82, 89, 90–92)

Silvanus gilae Casey, 1884 : 72. LECTOTYPE ♀ (here designated, see below), ARIZONA (USNM, Washington) [examined].

Length 2.76–3.77 mm. A large robust species with small eyes. *Head* broader than long (11.8–13.4 : 10), narrower across eyes than pronotum across anterior angles (10 : 12.1); clypeus and frontal triangle with rather dense ocellate setiferous puncturation, punctures separated by 1–2 diameters, sides of head with punctures less dense, interspaces granulate and with small irregular punctures; genae not produced; eyes small, 2.6–2.9 times as long as broad (Text-fig. 90); temple as long as 1–1.5 eye-facets. *Pronotum* a little longer than broad (10.8–11.4 : 10); puncturation as on head; sides rounded (Text-fig. 90) or comparatively straight (Text-fig. 91); disc slightly depressed towards base; *pro-meso-* and *metathorax* with coarse deep puncturation; interspaces with strong reticulation. *Elytra* 2.1–2.3 times as long as broad, setal punctures tuberculate, giving a rather granulate appearance; sides distinctly explanate from humeri to apex, explanation as broad as a stria.

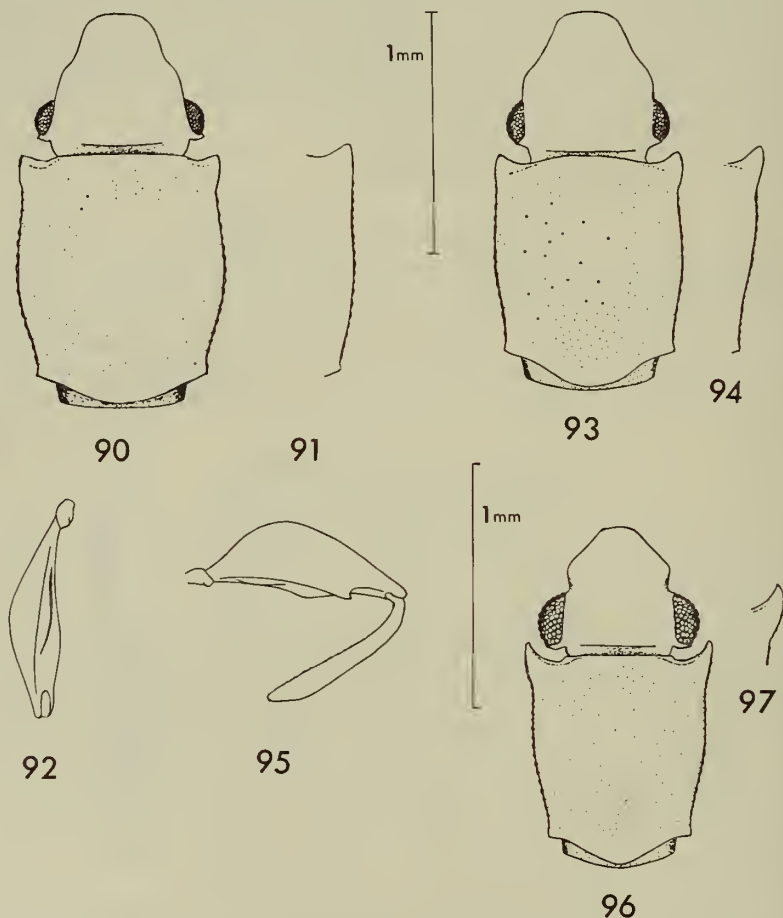
Abdominal sternites with shallow ill-defined punctures (irregular depressed areas) interspaces strongly reticulate. *Legs* in ♀ simple; in ♂ metatrochanter with a spine and metafemur with a prominent ridge which curves across from posterior to anterior margin (Text-fig. 92), all tibiae distinctly curved (in ♀ comparatively straight), metatibia with a conspicuous row of spinules along each margin. *Genitalia* ♂, Text-figs 79–82.

Number seen: 20.

Lectotype, present designation, ♀, length 3.32 mm, with 'Ari/CASEY bequest 1925/TYPE USNM 49142 [red label] gilae Ca'.

COMPARATIVE NOTES. Very closely related to *guatemalensis* from C. America but *gilae* has a less elongate head with smaller eyes, a pronotum usually of different shape, but both species tend towards the same form, and a broader elytral explanation.

DISTRIBUTION. Nearctic. U.S.A.: Colorado, Ouray and 'Col[orado]' in USNM, Washington; Arizona, S. Rita Mts (USNM, Washington and CAS, California), Huachuca Mts, Sta Cataline Mts, Graham Mts; New Mexico, Cloudcroft (all in CAS, California). MEXICO: N. Sonora (specimen mentioned in Sharp (1899)) (BMNH, London), 15 ml. S. of El Guarda, 13 ml. W of Milpillas Zacatecas, SE slope of Mt Colima (CAS, California).



FIGS 90-97. 90-94, *Pensus* gen. n. 90-92, *P. gilae* (Casey). 90, Head and pronotum. 91, Variant of side of pronotum. 92, Metatrochanter and femur of ♂. 93-94, *P. guatemalensis* (Sharp). 93, Head and pronotum. 94, Variant of side of pronotum. 95-97, *Calpus bacchi* gen. et sp. n. 95, Hind leg of ♂ (less tarsi). 96, Head and pronotum. 97, Variant of anterior angle of pronotum.

Pensus guatemalenus (Sharp) comb. n.

(Text-figs 83, 93, 94)

Silvanus guatemalenus Sharp, 1899 : 560. LECTOTYPE ♀ (here designated, see below), GUATEMALA (BMNH, London) [examined].

Length 3.09–3.64 mm. Similar to *gilae* in general facies, secondary sexual characters and puncturation. *Head* a little broader than long (11.4–11.6 : 10), narrower across eyes than pronotum across anterior angles (10 : 11.3–11.4); genae moderately produced; eyes prominent 2.4–2.8 times as long as broad; temples virtually absent (Text-fig. 93). *Pronotum* longer than broad (11.8–12.2 : 10); anterior angles well developed (Text-fig. 93) and may be strongly produced (Text-fig. 94); disc slightly depressed near apex, more obviously towards base. *Elytra* 2.1–2.2 times as long as broad; explanation at sides less than breadth of a stria (not as obvious as in *gilae*). *Genitalia* ♂, paramere and median lobe, Text-fig. 83.

Number seen: 12.

There are two syntypes on the same card mount.

Lectotype, present designation, ♀, length 3.48 mm, with 'Silvanus guatemalenus types D.S. Capetilla [Sharp's MS on card mount]/[circular red-bordered 'Type' label.]/Capetillo, Guatemala G.C. Champion/B.C.A. Col. 11 (1) Silvanus' left-hand specimen on card. Paralectotype ♀, length 3.79 mm, right-hand specimen on card.

COMPARATIVE NOTES. See *gilae*.

DISTRIBUTION. Neotropical; Central America. GUATEMALA: near the city, Capetillo, Cerro Zunil, San Gerónimo (Sharp, 1899) (BMNH, London); COSTA RICA (♂ and ♀) (USNM, Washington).

HABITATS. The specimens from Costa Rica were collected under the bark of *Quercus guatemalensis*.

CALPUS gen. n.

Type-species: *Calpus bacchi* sp. n.

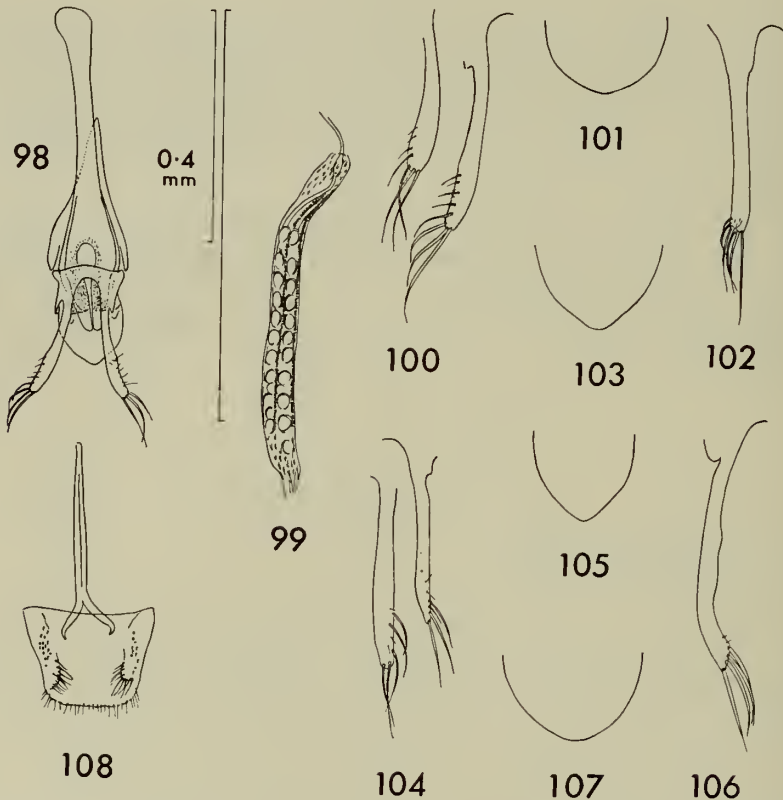
Number of species: 1.

This genus is erected to receive a species from New Guinea. The form of the genae, the large eyes and the anterior pronotal angles suggest a mere extension of the development found in *Silvanus*, while the general facies is similar to that of the American *Pensus*. However, the ♂ genitalia and sternites 8 and 9 (Text-figs 84–88) are different and although the occurrence of a tooth and ridge on the metafemur in both sexes may be a specific character it is, nevertheless, unique. The genus is closely related to *Silvanus* and shared characters are not included in the following description. *Dorsal surface* with puncturation dense, ocellate; pubescence obvious, consisting of short golden decumbent setae on head and thorax, similar setae directed caudad and forming obvious double rows along elytral interstriae. *Head* transverse; genae strongly produced, triangular; eyes large, prominent. *Pronotum* with extremely well developed prominent anterior angles and distinct posterior angles. *Elytra* with tuberculate setiferous punctures on interstriae; stria punctures deep. See specific description regarding secondary sexual characters. *Genitalia* ♂ (Text-figs 84–87) with median lobe acuminate at apex; parameres not forked, broad at apex with a few short setae.

Calpus bacchi sp. n.

(Text-figs 84-88, 95-97)

Length 2.60-3.17 mm. *Head* broader than long (12.7-13.3 : 10), narrower than pronotum (ratio of breadth across eyes to that across pronotal anterior angles 10 : 11.9-11.6); puncturation coarse and rugose, interspaces shining and bearing ocellate setiferous punctures; genae strongly produced laterally, triangular (Text-fig. 96); eyes large and prominent (1.9-2.2 times as long as broad); temples virtually absent (about half as long as an eye-facet). *Pronotum* (Text-fig. 96) longer than broad (12.3-12.6 : 10); puncturation as on head, general appearance rather granular; anterior angles very strongly produced anteriorly, curved and tapered to apex (Text-figs 96, 97); disc with a deep basal and shallow apical depression. *Elytra* 2.0-2.2 times as long as broad; setal punctures strongly tuberculate, giving elytra a rather granular appearance; stria punctures deep, interstriae slightly raised; explanation at sides of elytra as broad as a stria. *Ventral side* with coarse, dense and tuberculate puncturation on head, prosternum and mesosternum; disc of metasternum and abdominal sternites with tubercles, surface of



FIGS 98-108. *Cathartosilvanus*, male genitalia. 98-101, *C. vulgaris* (Grouvelle). 99, Internal sac. 100, Parameres of different specimens. 101, Apex of median lobe. 102-103, *C. tropicalis* (Van Dyke). 102, Paramere. 103, Apex of median lobe. 104-105, *C. trivialis* (Grouvelle). 104, Parameres of different specimens. 105, Apex of median lobe. 106-107, *C. imbellis* (LeConte). 106, Paramere. 107, Apex of median lobe. 108, *C. vulgaris* (Grouvelle) sternites 8 and 9.

abdominal sternites reticulate and shining. *Legs*. Metafemur in both sexes with a large tooth on anterior margin and a ridge on posterior margin. In ♂ (Text-fig. 95) an additional ridge on ventral side of metafemur; metatibia with a row of small spinules (absent in ♀). *Genitalia* ♂, Text-figs 84-87, sternites 8 and 9, Text-fig. 88.

Holotype ♂, length 3.17 mm, NEW GUINEA: Madang Distr., Finisterre Mts, Damanti, 3,550 ft, 2-11.x.1964 (*M. E. Bacchus*) (BMNH, London).

Paratypes. 1 ♂ with same data as holotype (BMNH, London); 1 ♂, NEW GUINEA: Adelbert Mts, Wanuma, 800-1000 m, 24.x.1958 (*J. L. Gressitt*) (BPBM, Honolulu); 2 ♀♀, 1 ♂, NEW IRELAND: ridge above 'Camp Bishop', 15 km up Kait R., 250-750 m, 13.vii.1956, light trap (*G. L. Gressitt*) (BPBM, Honolulu).

COMPARATIVE NOTES. Similar to the American *Pensus gilae* and *P. guatemalensis*. It may be distinguished from these species by the form of its head, pronotum and its legs. The puncturation of the head is less ocellate in this species than in *Pensus*.

CATHARTOSILVANUS Grouvelle *stat. n.*

Silvanus (*Cathartosilvanus*) Grouvelle, 1912 : 340. Type-species: *Silvanus trivialis* Grouvelle, by monotypy.

Number of species: 4.

Length 1.7-2.83 mm; general facies, pubescence, etc., rather similar to *Silvanus*, and characters are described here only when they differ or exhibit a different range of variation. *Head* transverse to slightly longer than broad; densely punctured, sometimes with punctures grouped to form large foveolate punctures (*imbellis*); genae slightly raised dorsally; temples short (as long as 1.5 eye-facets) to virtually absent. *Thorax* with pronotum quadrate (but appearing transverse) to elongate (12.4 : 10); anterior margin slightly depressed medially, lateral thirds or less, obviously sloped backwards to anterior angles; anterior angles poorly to well developed but quite different from *Silvanus* (Text-figs 109-111, 114); posterior angles well-defined; disc may be slightly depressed towards base and apex. *Legs* without secondary sexual characters (*trivialis*) or in ♂, metafemur with a short ridge or carina on posterior margin, metatibia with a row of spinules in same position. *First visible abdominal sternite* with femoral lines open, i.e. bordering metacoxal cavity mesally for a short distance then diverging and traversing part of segment (e.g. Text-fig. 112); in ♂ *vulgaris* this sternite usually bears a median longitudinal carina. *Genitalia*, aedeagus with median lobe rounded to very slightly tapered at apex; parameres not forked, elongate with long setae (3 or 4) at apex (Text-figs 100-106) intraspecifically variable; internal sac as in Text-fig. 99 or in *tropicalis* complex chitinous structure ill-defined and short; ♂ abdominal sternites 8 and 9 as in Text-fig. 108.

DISTRIBUTION. Nearctic and Neotropical.

KEY TO THE SPECIES OF *CATHARTOSILVANUS*

1 Pronotum as broad or broader than long (breadth : length, 10-10.5 : 10), sides short, giving pronotum transverse appearance.

Anterior angles of pronotum weakly developed (Text-fig. 114); largest punctures on head not broader than half eye-facet; length 1.7-2.1 mm. Neotropical and Arizona of Nearctic . . . *trivialis* (Grouvelle) (p. 84)

Pronotum longer than broad (length : breadth, 10.5-12.4 : 10), species with a shorter pronotum having well developed anterior angles 2

- 2 (1) Pronotum with sides more or less parallel, anterior angles little produced, inconspicuous (Text-fig. 111); ratio of pronotal length : breadth 11.5-12.4 : 10. Nearctic (and Brazil? see description) *imbellis* (LeConte) (p. 82)
- Pronotum with sides usually rounded (rarely straight), anterior angles well produced, obvious; ratio of pronotal length : breadth 10.5-11.2 : 10. Neotropical 3
- 3 (2) Anterior angles of pronotum rounded (Text-fig. 110); head and pronotum darker than elytra. Galapagos Is. *tropicalis* (Van Dyke) (p. 86)
- Anterior angles of pronotum more or less pointed (Text-fig. 109); body unicolorous. Neotropical *vulgaris* (Grouvelle) (p. 85)

Cathartosilvanus imbellis (LeConte) **comb. n.**

(Text-figs 106, 107, 111-113)

Silvanus imbellis LeConte, 1854 : 77. LECTOTYPE ♀ (here designated, see below), U.S.A.: Georgia (MCZ, Massachusetts) [examined].

? *Silvanus communis* Grouvelle, 1878 : 75. Syntypes, sex indet., BRAZIL. See below.

Length 2.42-2.83 mm. Moderately shining. *Head* broader than long (12.2-12.4 : 10), narrower across eyes than pronotum across anterior angles (10 : 11.3-11.7); puncturation coarse, dense and deep towards eyes and back of head where largest punctures as broad as twice an eye-facet diameter, clypeus and frontal triangle with finer punctures (breadth less than eye-facet) separated by up to 2 diameters, and often grouped to form large foveolate punctures; eye small, almost three times as long as broad, separated from clypeogenal emargination by slightly less than its length; temple very small less than a quarter of eye-facet diameter, post-genal area (ventral) broader than half an eye-breadth, eyes separated beneath head by about four times breadth. *Pronotum* (Text-fig. 111) longer than broad (11.5-12.4 : 10) in large males particularly elongate; punctures deep and dense, tending to be longitudinally confluent; anterior margin as in other *Cathartosilvanus* (see Text-figs), anterior angles poorly developed; sides more or less straight; disc with a very slight depression towards base, sometimes with a median longitudinal carina along median half or two-thirds; basal margin without a rim medially; posterior angles ill-defined, obtuse; prosternal punctures deep, prosternal process with a median depressed line but not deeply channelled as in *vulgaris*, puncturation coarse and deep; meso- and metasternum and abdominal sternites with deep punctures separated by 1-2 diameters (slightly larger than an eye-facet diameter). *Elytra* 2.1-2.3 times as long as broad; stria punctures deeper and interstriae more strongly raised than in *vulgaris* and *trivialis* but arrangement of interstitial setiferous punctures similar; lateral margins not explanate. *Legs* in ♀ simple, in ♂ metafemur with a characteristic carina towards apex of posterior margin (Text-fig. 113) metatibia with a row of spinules along posterior margin. *Genitalia* ♂, median lobe and paramere, Text-figs 106 and 107.

Number seen : 200+.

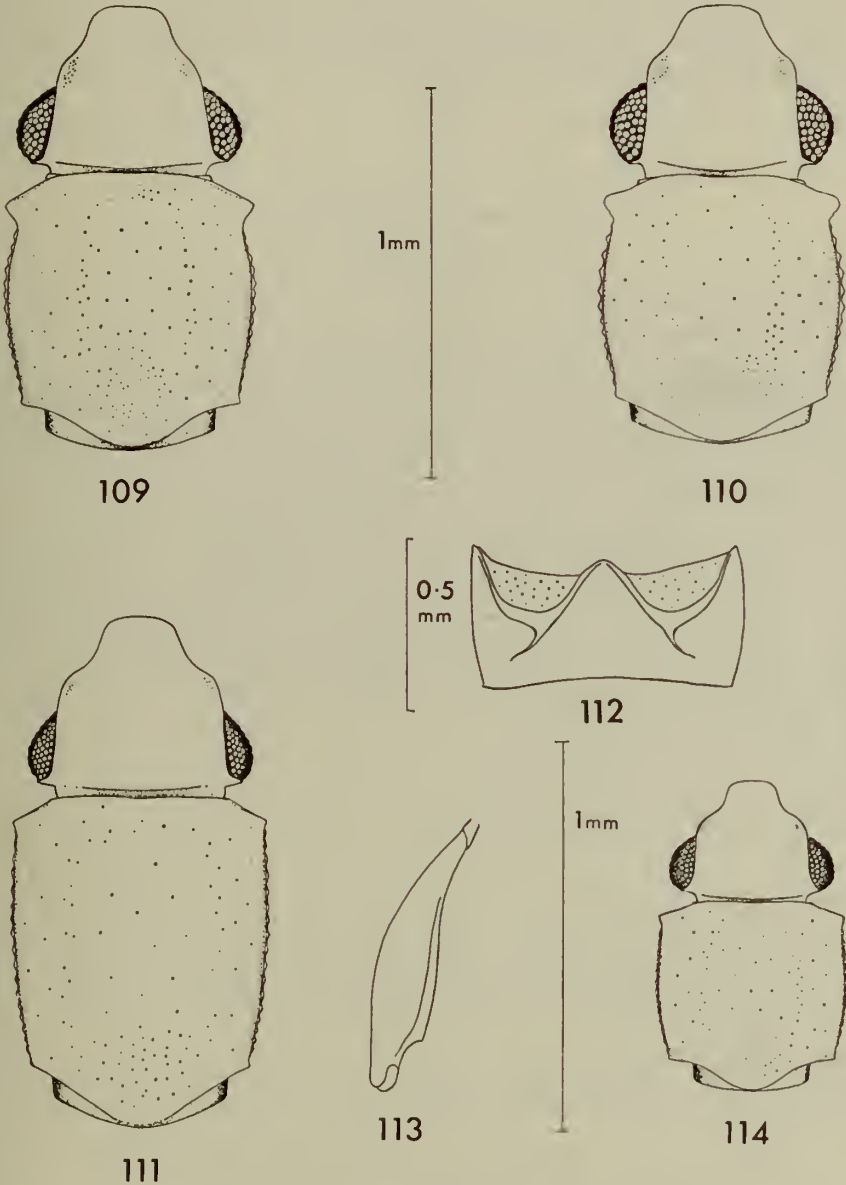
Lectotype of *imbellis* LeConte, present designation, ♀, length 2.70 mm, mounted on a small card point, bearing an orange card disc which indicates south-eastern states as the locality and with 'Type 6777 [red label]/*S. imbellis* Lec [MS]'. Paralectotype ♀ with an orange disc and small card mount as lectotype.

The type-locality given for *imbellis* is 'Georgia'. LeConte's collection in the Museum of Comparative Zoology, Massachusetts, contains only the above two specimens from the correct region and I have accepted them as syntypes.

I have not found the types of Grouvelle's *communis* (described from Brazil, Grouvelle and Reitter collections, and also recorded from Columbia by Grouvelle,

1912) and, while his description and figure suggest that his species and *imbellis* are the same, I have not seen Neotropical material of *imbellis*.

COMPARATIVE NOTES. Closely related to *trivialis* and *vulgaris* but easily dis-



FIGS 109-114. *Cathartosilvanus*. 109, *C. vulgaris* (Grouvelle) head and pronotum. 110, *C. tropicalis* (Van Dyke), same. 111-113, *C. imbellis* (LeConte) same. 112, 1st (visible) abdominal sternite. 113, Metatrochanter and femur of ♂. 114, *C. trivialis* (Grouvelle) head and pronotum.

tinguished by the elongate pronotum, head puncturation and the deeper punctures on the abdominal sternites.

DISTRIBUTION. Nearctic and, if *communis* is synonymous, Neotropical. CANADA: Ontario and Quebec. U.S.A.: Oregon, Nebraska, Iowa, Illinois, Kansas, Texas, Louisiana, Michigan, Indiana, Ohio, New York, Massachusetts, Pennsylvania, W. Virginia, Maryland, New Jersey, N. Carolina, Alabama, Georgia, S. Carolina. In USNM, Washington and CAS, California.

HABITATS. This species has been found under bark of *Castanea* and *Quercus*.

Cathartosilvanus trivialis (Grouvelle)

(Text-figs 104, 105, 114)

Silvanus trivialis Grouvelle, 1878 : 75. Syntypes, BRAZIL [not seen].

Silvanus (Cathartosilvanus) trivialis Grouvelle, 1912 : 340.

Length 1.7–2.1 mm. A small species. *Head* broader than long (10.5–12.8 : 10), narrower across eyes than pronotum across anterior angles (10 : 10.8–11.14); puncturation similar to that in *vulgaris*, largest punctures not broader than half an eye-facet; eye 2.3–2.9 times as long as broad, separated from clypeogenal emargination by about half its length; genae, temples, breadth of post-genal area and ventral separation of eyes as in *vulgaris*. *Pronotum* (Text-fig. 114) as broad as, or slightly broader than long (10–10.5 : 10) but appears more strongly transverse due to the more or less straight short sides (ratio of length of side to breadth 10 : 13.5–14.2); puncturation, anterior margin and posterior angles as in *vulgaris*; anterior angles very poorly to moderately developed – Text-fig. 114; disc very slightly depressed behind apical tenth, strongly depressed in front of basal tenth; basal margin sometimes with a distinct rim; prosternal process with longitudinally rugose puncturation between coxae (not deeply channelled) slightly depressed before apex. *Elytra* 1.8–2.0 times as long as broad, as in *vulgaris*. Apparently without secondary sexual characters. *Genitalia* ♂, median lobe, Text-fig. 105, parameres variable, Text-fig. 104.

Number seen: 250.

COMPARATIVE NOTES. This species is closely related and similar to *vulgaris*, from which it may be distinguished by the form of the prothorax and its smaller size.

DISTRIBUTION. Neotropical and into Nearctic. U.S.A.: California, Coachella Valley and Los Angeles Co.; Arizona, Graham Mts and San Carlos; MEXICO: Alamos, Durango, nr Rio Santiago Ferry, Sonora, Tamazunchale, Teapo and Veracruz (Port). GUATEMALA: Alta v. Paz, Rio Chagres, Senhau and Zapote; BRITISH HONDURAS: Rio Hondo (Sharp, 1899); HONDURAS: Lombardia; COSTA RICA: Limon, Rio Banano, Santa Clara and San José; PANAMA: Barro Colorado, Pearl Is, San José, Polochi River and Tabernilla (Canal Zone); ECUADOR: nr Santa Rosa; BRAZIL: Corumba; BOLIVIA: Yoay; CUBA: Cayamas; JAMAICA: Clarks Town and Santa Cruz; LEEWARD ISLANDS: Grenada, Guadelope, and St Vincent. In BMNH, London; CAS, California; USNM, Washington; ZM, Berlin.

HABITATS. *S. trivialis* has been imported to the U.S.A. on egg plants from Cuba, bananas from Guatemala, Mexico and ECUADOR [not included in the above distribution list], pineapples from Mexico and Honduras. It has been found on cedar

and mahogany logs (Honduras) and *Primavera* log (Guatemala). A large number of well-labelled specimens has been seen from Costa Rica (Nevermann Collection USNM, Washington) and these came from the following 'habitats': on dried fruit of *Musa textilis* Née (Manilla hemp) and dried leaves of *M. sapientum* (banana); on withered (welkem) foliage of *Saccharum officinarum* L. (sugar-cane), *Ochroleimonensis* Rowlee (cotton tree) and *Muntingia*; under loose bark – many records; in nest of weaver-bird, *Gymnostinops* and at light, also many records.

***Cathartosilvanus vulgaris* (Grouvelle) comb. n.**

(Text-figs 98–101, 108, 109, 127, 128)

Silvanus vulgaris Grouvelle, 1878 : 74. LECTOTYPE ♀ (here designated, see below), MEXICO (MNHN, Paris) [examined].

Length 2.26–2.78 mm. Rather dull. *Head* as broad or slightly broader than long (11.3 : 10), narrower across eyes than pronotum across anterior angles (10 : 11.1–11.5); everywhere densely punctured, clypeus and frontal triangle which extends to middle of head with irregular puncturation, punctures smaller than those at sides of head, largest 2/3 as long as an eye-facet; eye 2.5–3.0 times as long as broad, separated from clypeogenal emargination by half or less of its length; genae slightly raised above antennae to form a rim; temples virtually absent; eyes separated beneath head by twice or less of breadth; post-genal area (between submental sutures and eye) much narrower than half an eye-breadth; maxillary palp, Text-fig. 127, labial palp, Text-fig. 128. *Pronotum* (Text-fig. 109) a little longer than broad (10.8–11.2 : 10), general facies rounded (a few specimens have been seen with sides much straighter than in Text-fig. 109); densely punctured with coarse punctures (as broad as 1–1.5 eye-facet diameters); anterior margin slightly depressed medially, lateral thirds sloped backwards to anterior angles (see Text-fig. 109); anterior angles acute, well developed; disc with a small shallow depression behind apical tenth and a large deeper depression near base; basal margin without a rim medially; posterior angles almost right-angles; prosternal process obviously channelled between coxae and broadly depressed before apex, apical puncturation may appear longitudinally rugose. *Elytra* twice as long as broad; striae punctures separated longitudinally by a little less than diameter of a puncture; interstriae as broad as 1–1.5 striae punctures, flat or slightly raised, sutural interstria with a single row of tuberculate setiferous punctures, then alternate interstriae with double/single rows of these punctures, the double rows impinging on striae interspaces; lateral margins explanate from just below humeri to near apices and bearing a single row of tuberculate setiferous punctures. In ♂, first *abdominal sternite* usually with a median longitudinal carina, absent in ♀. *Legs* in ♀ simple, in ♂ metafemur with a short low ridge on basal quarter of posterior margin and metatibia with a row of spinules along posterior margin. *Genitalia* ♂, Text-fig. 98, internal sac, Text-fig. 99, parameres extremely variable, two forms illustrated in Text-fig. 100, apex of median lobe, Text-fig. 101, sternites 8 and 9, Text-fig. 108. Number seen: 50.

Lectotype, present designation, ♀, length 2.72 mm, with 'Nov [MS]/Mexique Cordoba (Salle) [MS of Grouvelle on green label]/Type[ptg.]/*Silvanus vulgaris* (Salle) Cordoba Mexique [MS]'.

COMPARATIVE NOTES. See *trivialis* and *tropicalis*.

DISTRIBUTION. Neotropical. MEXICO: Cordoba (type-locality), Guanajuato; Nayarit and Oaxaca Monte Alban; GUATEMALA: S. Geronimo and Zapote; COSTA RICA: Reventazon, San José and Terris de Barba; PANAMA: nr Boquete; COLOMBIA:

nr Sasoima; BRAZIL: Sta Catharina; ARGENTINA: Tabillas Saita. In BMNH, London; CAS, California; MNHN, Paris; USNM, Washington and ZM, Berlin.

HABITATS. This species has been imported to Britain on Brazil nuts from Belon and on Brazilian cocoa beans. In Costa Rica (Nevermann Collection USNM, Washington) it has been collected at light, on fruits of *Musa textilis* Née (Manilla hemp), dead leaves of *Sechium edule* Swartz, and under loose bark.

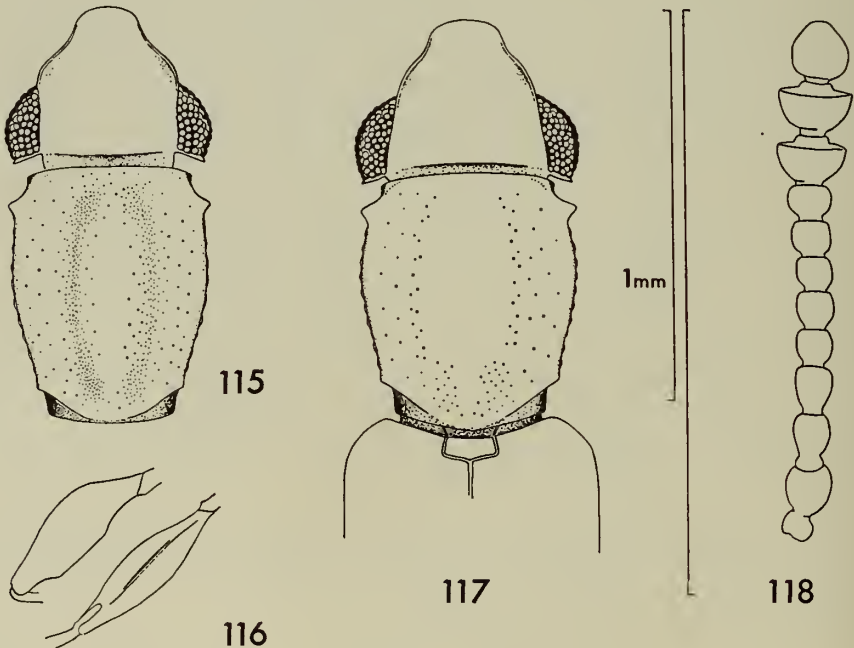
***Cathartosilvanus tropicalis* (Van Dyke) comb. n.**

(Text-figs 102, 103, 110)

Silvanus tropicalis Van Dyke, 1953 : 62. Holotype sex indet., GALAPAGOS Is. (CAS, California) [paratypes examined].

The following description is based on two paratypes (♂, ♀) which are in the CAS, California; measurements etc., are quoted for the ♂ first. This species is similar to *vulgaris* and characters are described only when they differ from that species.

Length 2.65, 2.76 mm. A rather dull coarsely punctured species with head and pronotum darker than elytra. *Head* slightly broader than long (11.7, 11.5-10) across eyes slightly narrower than pronotum across anterior angles (10 : 10.2, 10.6), densely punctured, largest punctures at side of head larger than eye-facets; eyes large and prominent, 2.1, 2.3 times as long as broad. *Pronotum* (Text-fig. 110) a little longer than broad (11.0, 10.5 : 10), puncturation coarse and dense, towards sides punctures becoming as broad as 1.5 eye-facets or



FIGS 115-118. *Silvanoides* gen. n. 115-116, *S. foveicollis* sp. n. 115, Head and pronotum. 116, Male metatrochanter and femur, side and ventral views. 117-118, *S. cheesmanae* sp. n. 117, Head and pronotum. 118, Antenna.

more; anterior angles well developed, rounded; disc with a distinct depression towards base. *Elytra* 1.8 times as long as broad. *Legs* in ♀ simple, in ♂ tibia with denticles on posterior margin (in ♂ examined femur without a distinct ridge). *Genitalia* ♂, paramere Text-fig. 102, apex of median lobe Text-fig. 103.

Holotype and three paratypes from Indefatigable I., Galapagos Is. (no habitat data given) in CAS, California, and one paratype in BMNH, London.

COMPARATIVE NOTES. This species may be distinguished from *vulgaris* by its rounded anterior angles, coarser puncturation, comparatively larger eyes and broader appearance.

DISTRIBUTION. Neotropical. ECUADOR: Galapagos Is.

***SILVANOIDES* gen. n.**

Type-species: *Silvanoides cheesmanae* sp. n.

Number of species: 2.

Length 2.42–2.6 mm; this genus has many characters in common with *Silvanus*, and these are not included in the following description. *Head* transverse (for description of puncturation see specific descriptions); sides of head with a rim, fine on clypeus becoming broader and raised on genae (Text-figs 115–117). *Antennae* (Text-fig. 118) with scape a little longer than segment 2, segments 4–8 quadrate to transverse, segment 8 more transverse than 7, club segments 9 and 10 more transverse and general appearance more moniliform than in *Silvanus*. *Eyes* large, temples very narrow extending laterally as platform beneath eye (see Text-fig. 115), similar to some *Protosilvanus*. *Pronotum* with puncturation much coarser than on head; anterior angles small, lateral and rather variable (similar to *Cathartosilvanus*); serration on side margins not as obvious as in *Silvanus* (about 10–15 denticles); posterior angles well-defined.

Legs simple in ♀, in ♂ metatrochanter with a slight apical prominence, metafemur with a ridge on ventral side. *Elytra* with epipleura broad, tapering to apex. *First visible abdominal sternite* with femoral line open, short, see Text-fig. 119. *Genitalia* ♂ (Text-figs 121–126) with median lobe tapered to apex, parameres characteristic, bearing two long setae on one side of apex and a short process with fine setae on the other, Text-fig. 123; ♂ sternites 8 and 9 as in Text-fig. 120.

DISTRIBUTION. Oriental.

KEY TO SPECIES OF *SILVANOIDES*

- 1 Pronotum with distinct lateral foveae. *foveicollis* sp. n. (p. 88)
- Pronotal disc slightly depressed on each side *cheesmanae* sp. n. (p. 87)

***Silvanoides cheesmanae* sp. n.**

(Text-figs 117, 118, 125, 126)

Length 2.42–2.52 mm. *Head* broader than long (13.8–14.7 : 10), as broad or slightly broader across eyes than pronotum across anterior angles (10.0–10.4 : 10); puncturation irregular, a mixture of fine and coarse punctures, largest punctures towards side of head not more than half an eye-facet diameter, interspaces shining; lateral rim moderately developed above genae; eye large and prominent, temple equivalent to about half an eye-facet diameter; antenna, Text-fig. 118. *Pronotum* (Text-fig. 117) 1.14–1.18 times as long as broad, with a compara-

tively finely and sparsely punctured shining region medially on disc, punctures towards sides and base abruptly becoming extremely coarse, largest punctures equal to 1.5 eye-facets in diameter; anterior angles small, variable (Text-fig. 117); obviously lower than anterior margin, disc very slightly depressed on each side, depressions more obvious towards base. *Elytra* 2.16–2.28 times as long as broad. *Legs*, in ♂ metatrochanter with a very small prominence, metafemur with a ridge on median third similar to *foveicollis* but shorter, less prominent and more oblique. *Genitalia* ♂, as in Text-figs 125, 126.

Holotype ♀, length 2.52 mm, NEW GUINEA: Cyclops Mts, Sabron, 2,000 ft, vi.1936 (*L. E. Cheesman*).

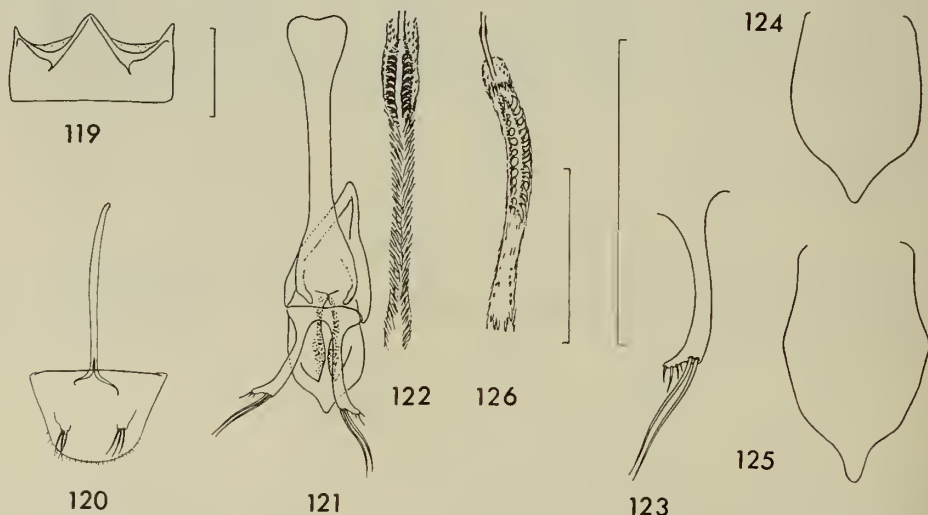
Paratypes (6). 1 ♀, NEW GUINEA, Kodoka, 1,200 ft, viii. 1933 (*L. E. Cheesman*); 1 ♀, Finschhafen, 9.v.1944 (*E. S. Ross*); 1 ♂ and 1 ♀, SOLOMON IS: Choiseul Is., Malangono, 29.viii.1963 (*P. J. M. Greenslade*) 9262; 1 ♀, Malaita, Small Malaita, 11.vii.1966 (*P. J. M. Greenslade*) 23319; 1 ♀, PHILIPPINE IS: Mindoro, San Jose, 30.i.1945 (*E. S. Ross*). The two specimens collected by Ross are in the CAS, California, and the holotype and other paratypes in the BMNH, London.

DISTRIBUTION. Philippine Is, New Guinea and Solomon Is.

Silvanoides foveicollis sp. n.

(Text-figs 115, 116, 119–124)

Length 2.43–2.64 mm. *Head* broader than long (12.9–14.1 : 10) slightly broader across eyes than pronotum across anterior angles (10.1–10.6 : 10); puncturation variable, may be denser and less uneven than in *cheesmanae* but otherwise similar to this species; lateral rim



FIGS 119–126. *Silvanoides* gen. n. 119–124, *S. foveicollis* sp. n. 119, 1st visible abdominal sternite. 120, Sternites 8 and 9 of ♂. 121, Male genitalia. 122, Internal sac. 123, Paramere. 124, Median lobe. 125–126, *S. cheesmanae* sp. n. 125, Median lobe. 126, Internal sac. Scale lines = 0.3 mm.

well developed above genae; eye large and prominent, temple short as in *cheesmanae*. *Pronotum* (Text-fig. 115) elongate 1.29–1.41 times as long as broad, with obvious longitudinal foveae which, like sides, are coarsely punctured, particularly so towards base where largest punctures are as long as 1.5 eye-facets; anterior angles small, slightly lower on side margin than in *cheesmanae* (see Text-figs). *Elytra* 2.18–2.21 times as long as broad. *Legs* (Text-fig. 116) in ♂ metatrochanter with a very small prominence, metafemur with a ridge along middle third of ventral side. *Genitalia* ♂, Text-figs 121–124, ♂ sternites 8 and 9, Text-fig. 120.

Holotype ♂, length 2.43 mm, SOLOMON IS: Guadalcanal, Mt Austen, 11.ii.1965 (*P. J. M. Greenslade*) 15687. Paratypes, 1 ♀ and 1 ♂, SOLOMON IS: Choiseul Is, Malangono, 25.viii.1963 (*P. J. M. Greenslade*) 9262. All types in BMNH, London.

COMPARATIVE NOTES. This species, which is extremely closely related and similar to *cheesmanae*, may be distinguished by its more tapered and elongate pronotum which has distinct longitudinal foveae and by its pubescence, which is more obvious. The ♂ genitalia in *foveicollis* has the apex of the median lobe (in specimens seen) less tapered than in *cheesmanae* and the internal sac is different (see Text-figs).

PROTOSILVANUS Grouvelle *stat. n.*

Silvanus (*Protosilvanus*) Grouvelle, 1912 : 336. Type-species: *Silvanus lateritius* Reitter, by PRESENT DESIGNATION.

Number of species: 5.

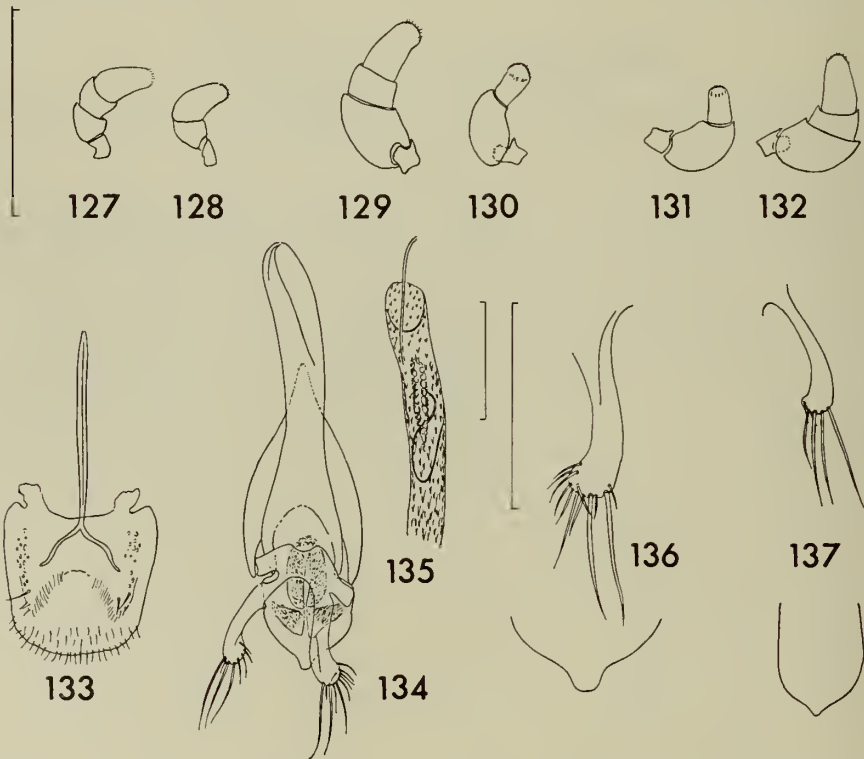
Length 2.00–4.23 mm; depressed and elongate, moderately shining to dull, reddish to yellowish brown, one species with bicoloured prothorax and fasciate elytra; surface with fine decumbent golden pubescence. *Head* transverse, puncturation dense to sparse, ocellate at sides; clypeal margin almost straight, clypeogenal emargination slightly depressed above but not foveolate; genal margin hardly raised above antennae. *Antennae* similar to *Silvanus* but segments rather more transverse and some species with distinct spines on lateral margins of club segments 9 and 10 (Text-fig. 144). *Eye* large, temples very short, either shelf-like (Text-fig. 143) or similar to Text-fig. 138. *Mouth parts* similar to *Parasilvanus* (Text-figs 129, 130, labial and maxillary palps). *Thorax* with pronotum elongate (12.5–16.4 : 10); puncturation similar to that on head; anterior margin more or less straight; anterior angles very poorly to moderately developed, not tapered to apex; side margins finely serrate; posterior angles well- or ill-defined; medially, posterior margin not confluent with rim of foramen; disc slightly to moderately depressed on each side of mid-line, which may be slightly carinate. *Scutellum* transverse. *Prosternum* with sternopleural sutures ill-defined, meeting lateral margin at about apical one-fifth, where there is first indication of development of anterior angle, procoxal cavities broadly closed behind, prosternal process not much narrower medially than apex, slightly depressed or sulcate behind apical margin. *Mesosternal* apex not much narrower than that of prosternal process (both very broad when compared with *Silvanus*). *Metasternum* with median line complete or becoming obsolete at or within basal half (i.e. towards mesosternum). *Legs* with tarsi 5-segmented, penultimate segment very small, segment 3 simple; secondary sexual characters exhibited by ♂ as follows: metatrochanter with a prominent spine on inner apex, metatibia usually with a tooth on posterior margin near apex, sometimes tooth also present on mesotibia. *Elytra* each with 9 rows of punctures forming striae; interstriae either with alternate single and double rows of setae or with single row on 1 and double rows on 2–4 then alternate rows; interstria 1 (sutural) slightly raised, interstria 7 strongly or moderately carinate, either other interstria very slightly raised or, in *carinatus*, 5 slightly raised at base and 3 carinate for greater part of its length; not explanate at sides; epipleura broad, tapering to apex. *Wing*

well developed, similar to *Silvanus*. *Metendosternite* without a stem. *First visible sternite of abdomen* with femoral line closed as in *Silvanus*, in ♂ abdominal sternites may have tubercles (*carinatus* and *fasciatus*). *Genitalia*, ovipositor similar to *Silvanus* but with styli and valvifers comparatively broader; aedeagus with median strut as in Text-fig. 134 or tapered to apex, Text-fig. 141, parameres broad at apex and bearing 3 or 4 long and several shorter setae, median lobe as illustrated, internal sac with complex chitinous structure very short (*lateritius*, Text-fig. 135) or long.

DISTRIBUTION. Oriental.

KEY TO THE SPECIES OF *PROTOSILVANUS*

- 1 Interstria 3 strongly carinate for at least basal three-quarters. Sumatra and Singapore **carinatus** Grouvelle (p. 93)
- Interstria 3 flat or slightly raised, not carinate 2
- 2 (1) Anterior angles of pronotum as in Text-figs 138, 146 or 147; dull; median line on metasternum almost complete; elytra fasciate or unicolourous; smaller species, 2.0-3.14 mm 3



FIGS 127-137. 127-128, *Cathartosilvanus vulgaris* (Grouvelle). 127, Maxillary palp. 128, Labial palp. 129-130, *Protosilvanus lateritius* (Reitter). 129, Maxillary palp. 130, Labial palp. 131-132, *Parasilvanus ocellatus* (Grouvelle). 131, Labial palp. 132, Maxillary palp. 133-136, *Protosilvanus lateritius* (Reitter). 133, Sternites 8 and 9 of ♂. 134, Male genitalia. 135, Internal sac. 136, Paramere and apex of median lobe. 137, *Protosilvanus granosus* (Grouvelle) same. Scale lines = 0.2 mm.

- Anterior angles of pronotum poorly developed, not as in above Text-figs; shining; median line on metasternum ill-defined (at least on basal quarter) or absent on basal half; elytra unicolourous; larger species, 2.14–4.23 mm 4
- 3 (2) Elytra with a broad dark fascia, lighter regions forming ill-defined patches; interstria 7 strongly carinate; eyes smaller (Text-fig. 138); antennal segment 8 less transverse (Text-fig. 139). Fiji *fasciatus* sp. n. (p. 91)
- Elytra unicolourous; interstria 7 moderately (sometimes weakly) carinate; eyes larger; antennal segment 8 more transverse. Oriental
- 4 (2) Shining, pubescence inconspicuous (sparse); discal depressions of pronotum with sparse puncturation on apical half; prosternal process with a deep sulcus behind apical margin; head and pronotum as in Text-fig. 145. New Caledonia *granosus* (Grouvelle) (p. 93)
- Moderately shining, pubescence obvious (relatively dense); pronotum with puncturation everywhere dense, prosternal process shallowly depressed behind apical margin; head and pronotum as in Text-fig. 143. Oriental *inaequalis* (Grouvelle) (p. 95)
- *lateritius* (Reitter) (p. 96)

Protosilvanus fasciatus sp. n.

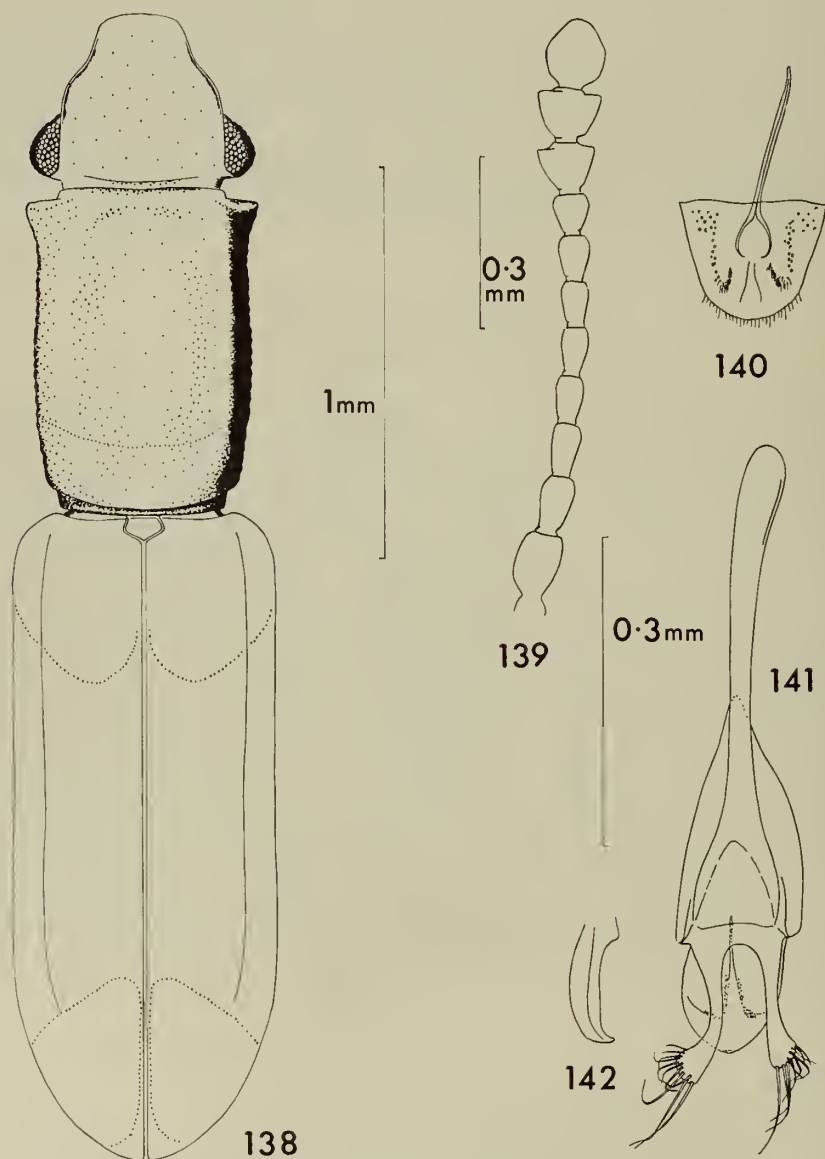
(Text-figs 138–142)

Length 2.72–2.96 mm. Dull, surface with rather granulate appearance; head and apical two-thirds to three-quarters of pronotum light reddish brown, basal region of pronotum, middle half and extreme apices of elytra dark brown (lighter regions forming patches, Text-fig. 138). *Head* broader than long (11.3–12 : 10) with ocellate setiferous punctures dominant, some small deep punctures on frontal triangle; ventral puncturation similar to prosternum, appearing granulate. *Eye* separated from clypeogenal emargination by its length, smaller than in other *Protosilvanus*. *Antenna*, Text-fig. 139. *Pronotum* (Text-fig. 138) puncturation as on head; elongate, 14.5–16.4 : 10, broader or narrower across anterior angles than head across eyes (10.2 : 10 or 10 : 10.1); anterior angles well developed; disc with shallow lateral depressions, ill- or well-defined medially, apical limit obvious, without a median carina; posterior angles ill-defined; basal margin separate from rim of foramen. *Thoracic sternites* with tuberculate setiferous punctures, tubercles on metasternal disc often less pronounced than elsewhere – general appearance of sternites granulate. *Prosternum* with some coarse punctures towards coxal cavities, apical fifth with ill-defined rugosity, apical eighth raised; prosternal process slightly depressed medially. *Metasternum* shallowly depressed on each side of disc, median line becoming obsolete towards mesosternum. *Elytra* 2.48–2.70 times as long as broad; stria punctures deep; interstriae 3 and 5 slightly raised at base, 7 carinate to approximately apical fifth (Text-fig. 138). *Abdominal sternites*. Not as dull as rest of ventral surface, setae arising from slightly raised areas. In ♀ sternites 1 and 2 with disc slightly depressed, in ♂ these sternites with shallow but distinct depressions, sternite 3 of ♂ with a median tubercle near caudal margin. *Legs* simple in ♀, in ♂ metatrochanter with a small protuberance, metatibia with a small lamellate tooth towards apex (as in Text-fig. 152). *Genitalia* ♂, Text-figs. 141–142, sternites 8 and 9 Text-fig. 140.

Holotype ♂, length 2.72 mm, dissected, FIJI Is.: Taveuni, Waiyeve, 21.vi.1924 (*Dr H. S. Evans*).

Paratypes. 4 with same data as holotype and 6 with same data but collected 7.i.1924. Each specimen also bears a label with a pencilled number as follows, holotype: 158.24, paratypes: 155.24, 156.24, 157.24, 159.24, 1652.24, 1653.24, 1654.24, 1656.24, 1658.24, 1659.24. All types in BMNH, London.

COMPARATIVE NOTES. The fasciate elytra of this species distinguish it from all others described in this revision. Teneral specimens might be confused with *granosus*; the latter, however, has larger eyes, a more transverse antennal segment 8 and less pronounced elytral carinae. The bent apex of the median lobe of the ♂ genitalia (Text-fig. 142) is also diagnostic for *fasciatus*.



FIGS 138-142. *Protosilvanus fasciatus* sp. n. 139, Antenna. 140, Sternites 8 and 9 of ♂. 141, Male genitalia. 142, Median lobe, lateral view.

Protosilvanus granosus (Grouvelle)

(Text-figs 137, 146, 147)

Silvanus granosus Grouvelle, 1897 : 396. LECTOTYPE ♂ (here designated, see below), SUMATRA (MNHN, Paris) [examined].

Silvanus (Protosilvanus) granosus Grouvelle, 1912 : 336.

Length 2.00–3.14 mm. General appearance dull; ventral surface dull and with small tubercles which are particularly obvious at sides of metasternum and abdominal sternites. *Head* broader than long (12.4–13.2 : 10) moderately shining on clypeus and disc of vertex; sides of head with ocellate setiferous punctures on interspaces of slightly larger punctures, puncturation elsewhere not so obviously ocellate; antennae with segment 8 more transverse than in *lateritius*. *Pronotum* slightly to moderately elongate (12.5–15.2 : 10); puncturation as on sides of head; anterior angles usually prominent (Text-fig. 147), sometimes less produced (Text-fig. 146), always more evident than in *lateritius* and except in the smallest specimen seen (ratio 10 : 10.3) pronotum slightly broader across anterior angles than head across eyes (10.2–10.9 : 10); disc shallowly depressed, median ridge absent or ill-defined. *Thoracic sternites*. Prosternum with weak transverse rugosity on apical third, apical eighth raised; prosternal process with a shallow depression before apex, apical margin rather granulate; mesosternum slightly depressed; metasternum with median line well-defined from near base to apex. *Elytra* 2.41–2.68 times as long as broad, puncturation as in *lateritius*; interstriae 1 (sutural), 3 and 5 slightly raised, 7 moderately (sometimes weakly) carinate. *Legs*. In ♂ metatrochanter with a prominent spine on inner apex, in ♀ simple. *Genitalia* ♂, Text-fig. 137.

Number seen : 37.

Lectotype, present designation, ♂ with 'Sumatra [Grouvelle's MS] Type [ptg., pink label] *Silvanus granosus* ty Grouv/granosus Grouv [both labels in Grouvelle's MS]'. Paralectotypes, 3 ♀♀ with 'Sumatra/Type' as on lectotype. All in MNHN, Paris, but Grouvelle in his original description states 'Sumatra (Deli). Collection Grouvelle. Engano (Bua-Bua). E. Modigliani. Collection du Musee Civique de Genes'; thus other paralectotypes should be in Genoa, Italy.

COMPARATIVE NOTES. See *fasciatus* for characters distinguishing it from this species. The form of the anterior angles of the pronotum, the dull general appearance and the almost complete median line on the metasternum distinguish *granosus* from the other three species in the genus.

DISTRIBUTION: Oriental. CEYLON: Kandy and Nawalapitiya; MALAYA: 16 mls NE of Kuala Lumpur; SINGAPORE; SUMATRA: Mentawai (and type-localities) and Nias Is; JAVA: Buitenzorg; PHILIPPINES: Binaluan, Luzon and Palawan; N. MOLUCCAS: Ternate; SOLOMON IS: Guadalcanal and Malaita. In BMNH, London; MNHN, Paris; USNM, Washington and ZM, Berlin.

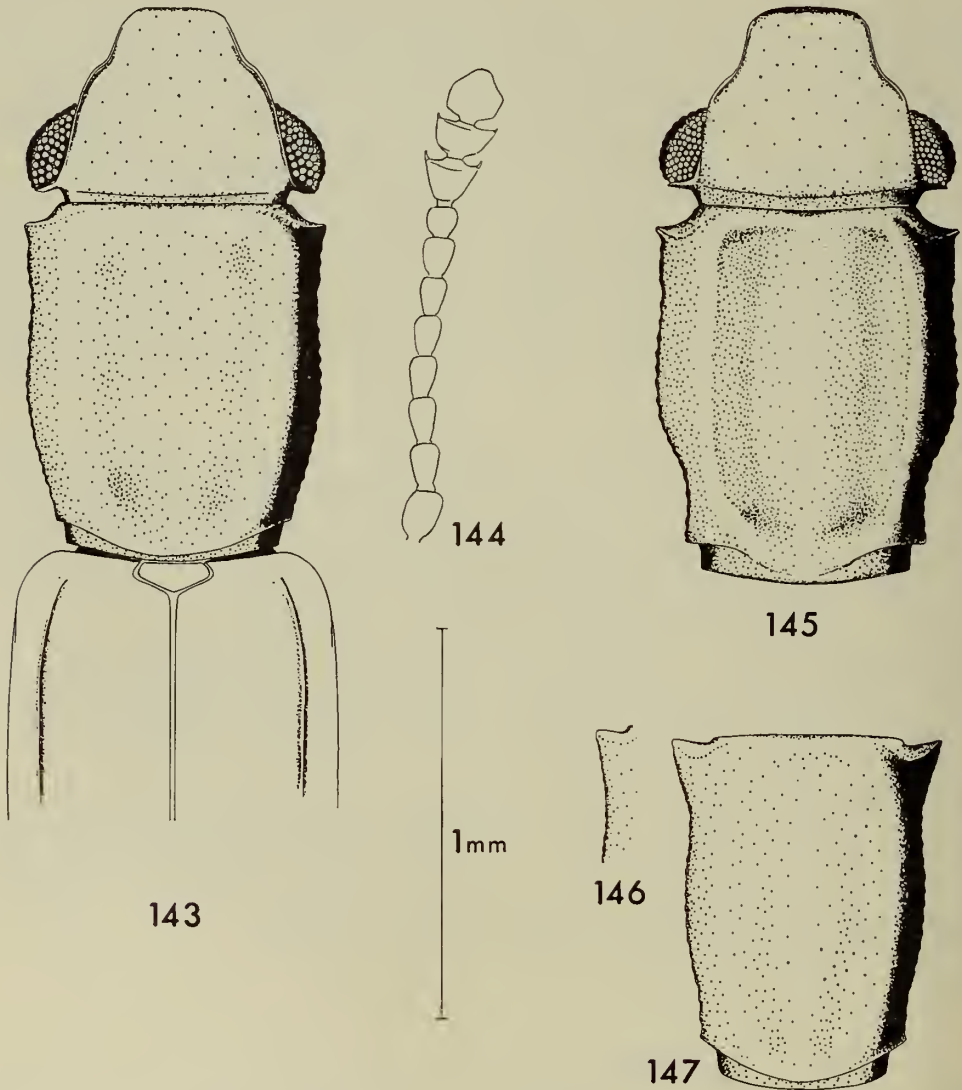
HABITAT. Under bark of dead branch of *Ficus* (Java).

Protosilvanus carinatus (Grouvelle)

Silvanus (Protosilvanus) carinatus Grouvelle, 1912 : 336. LECTOTYPE ♂ (here designated, see below), (MNHN, Paris) [examined].

Length 3.11–3.57 mm. Moderately shining, puncturation similar to *lateritius*. *Head* broader than long (13.9–14.1 : 10), slightly broader across eyes than pronotum across anterior angles (10.3–10.4 : 10). *Pronotum*, shape as in *lateritius* but disc with broad longitudinal

depressions deeper and a more obvious ridge between them; longer than broad (14.2-14.4 : 10). *Thoracic sternites*. Pro- and mesosternum similar to *lateritius*; metasternal disc slightly depressed on either side of median line which is ill-defined on basal half. *Elytra* 2.81-2.88 times as long as broad, shining; interstria 7 carinate to near apex and 3 carinate for at least basal three-quarters, 5 slightly raised at base. *Abdominal sternites* in ♀ simple, in ♂ 1 may have a very weak median prominence, 2 has a slightly more distinct micro-tubercle, 3 a small median



FIGS 143-147. *Protosilvanus*. 143-144, *P. lateritius* (Reitter). 143, Head, pronotum and base of elytra. 144, Antenna. 145, *P. inaequalis* (Grouvelle) head and pronotum. 146-147, *P. granosus* (Grouvelle). 146, Variant of anterior angle of pronotum. 147, pronotum.

somewhat carinate tubercle, 4 may have a median micro-tubercle. *Legs* in ♂, metatrochanter with a prominent spine on inner apex, metatibia with a tooth on posterior margin near apex. In ♀ legs simple.

Number seen: 5.

Lectotype, present designation, ♂ with 'Sumatra Palembang [Grouvelle's MS - violet ink]/Type [ptg., pink label]/carinatus Grouv [Grouvelle's MS]'. Paralectotypes, 2 ♂♂ with same locality data and type labels as lectotype and 1 ♂ with 'Singapore Raffray [MS]/Type [ptg., pink label]'. All in MNHN, Paris.

In addition to the above I have seen 1 ♀ from Sumatra in Grouvelle's collection (MNHN, Paris).

COMPARATIVE NOTES. The carinate interstriae 3 and 7 distinguish this species.

DISTRIBUTION: Oriental. SUMATRA and SINGAPORE.

Protosilvanus inaequalis (Grouvelle)

(Text-fig. 145)

Silvanus inaequalis Grouvelle, 1882 : 293. LECTOTYPE ♀ (here designated, see below), NEW CALEDONIA (MNHN, Paris) [examined].

Silvanus (Protosilvanus) inaequalis Grouvelle, 1912 : 336.

Length 3.62 mm. Shining, pubescence sparse. *Head* (Text-fig. 145) broader than long (14.5 : 10); clypeus and frontal triangle, which extends to back of vertex, with punctures as long as one half of eye-facet diameter, and separated by 3-5 times their length, also some minute punctures scattered amongst them, all punctures bearing fine setae (length about twice eye-facet diameter); towards sides of head, punctures becoming large and ocellate (breadth including margin equal to slightly more than that of an eye-facet) and separated by a puncture diameter (including margin) or less; head across eyes slightly narrower than pronotum across anterior angles (10 : 10.2). *Pronotum* (Text-fig. 145) longer than broad (12.6 : 10); disc with broad longitudinal depressions; puncturation on apical half of depressions and median raised region sparse, as on vertex of head, rest of puncturation ocellate as on sides of head; anterior angles little developed. *Thoracic sternites*. Prosternum with apical one-eighth raised and impunctate (except for marginal row of setiferous punctures), then with a broad band of strong transverse rugosity covering rest of apical third, prosternal process with a deep sulcus behind broad apical margin which is strongly rugose; mesosternum shining and deeply depressed; median line of metasternum becoming ill-defined on basal fourth. *Elytra* 2.55 times as long as broad, shining; stria punctures separated by a diameter or less, and interstriae as broad as stria punctures; interstria 7 carinate, interstria 1 slightly raised and producing sutural margin, all other interstriae more or less flat, interstriae, 1, 3, 5 and 7 each with a single row of setiferous punctures, which are ocellate at the basal fifth but soon become very small and lose raised rims, alternate interstriae with more irregular row of setiferous punctures, confused by those on interspaces (one on each interspace) which tend to be close to these interstriae.

Number seen: 1.

Grouvelle (1883) in his description states 'Nouvelle Calédonie. Coll. Grouvelle et Gambey', suggesting that he had more than one specimen before him. There is only one specimen in MNHN, Paris.

Lectotype, present designation, ♀ with 'Nlle Caledonie Montrouzier [MS]/Type [ptg.]/inaequalis A. Grouv [MS]/inaequalis Grouv [MS]'.

COMPARATIVE NOTES. Closely related to *lateritius* Reitter but easily distinguished by the puncturation of the head and prothorax and the sparse pubescence.

DISTRIBUTION. NEW CALEDONIA; in addition to the above localities, the 'Ile des Pins' and 'Coulée Boulari' are recorded by Fauvel (1903).

Protosilvanus lateritius (Reitter)

(Text-figs 133-136, 143, 144)

Silvanus lateritius Reitter, 1879 : 194. Type(s), CEYLON [not seen, not in TM, Budapest].

Silvanus (Protosilvanus) lateritius Reitter; Grouvelle, 1912 : 336.

Length 2.61-4.23 mm. Moderately shining, pubescence obvious. *Head* broader than long (13.4-14.6 : 10); puncturation variable, particularly dense in specimens seen from Vietnam and Malaya, clypeus comparatively sparsely punctured, rest of head with coarse deep punctures, as broad as an eye-facet (separated by 1-2 diameters in front of vertex and by less than a diameter, elsewhere) and smaller setiferous punctures usually ocellate throughout, always ocellate at sides of head, setae about twice an eye-facet diameter; head across eyes very slightly narrower than pronotum across anterior angles (10 : 10.3-10.5). *Antenna*, Text-fig. 144. *Pronotum* (Text-fig. 143) longer than broad (12.7-14.1 : 10); puncturation similar to that on sides of head, everywhere dense; sides may be slightly more convergent or parallel than in Text-fig. 143; anterior angles little developed; disc with very shallow broad longitudinal depressions, mid-line raised. *Thoracic sternites*. Prosternum without strong transverse rugosity on apical third, although weak rugosity may be present, apical one-eighth raised and with sparse puncturation in addition to marginal row of punctures; prosternal process shallowly depressed behind apical margin, margin coarsely punctured, sometimes slightly rugose; mesosternum moderately shining to dull, more or less flat; metasternal disc flat, median line ill-defined or absent on basal 1/2. *Elytra* 2.38-2.76 times as long as broad (particularly elongate in large specimens), shining; puncturation as in *inaequalis* but interstrial punctures of apical fifth not very obviously ocellate and of similar size along length of interstriae, interstriae 3 and 5 slightly raised at base, 7 carinate to apex, other interstriae more or less flat. *Legs*. In ♂, metatrochanter with a prominent spine on inner apex, meso- and metatibia with a very small tooth near apex of posterior margin, sometimes absent or ill-defined on one pair. In ♀, legs simple. *Genitalia* ♂, Text-figs 134-136, sternites 8 and 9, Text-fig. 133.

Number seen: 120.

COMPARATIVE NOTES. Similar to *inaequalis* but easily distinguished as described under that species. Small specimens resemble *granosus* but the more strongly carinate interstria 7 and general shining appearance are diagnostic for *lateritius*.

DISTRIBUTION. Oriental. Previously recorded localities (Hetschko, 1930): INDIA, CEYLON, BURMA, ANDAMAN IS, VIETNAM, MALAYA, SINGAPORE, SUMATRA, TAIWAN, JAPAN. During the present study specimens have been seen from all recorded localities except Sumatra and in addition from NEPAL: nr. Hitaura; BANGLADESH: Harbang forest nr. Chiringa; THAILAND: Doi Suntep east slope and Khao-Yai National Park; CHINA: Hainan Is, Dwa Bi and N. Kwangtung Lung-Tau-Shan; PHILIPPINES: Luzon. In BMNH, London; CAS, California; MF, Munich; TM, Budapest and USNM, Washington.

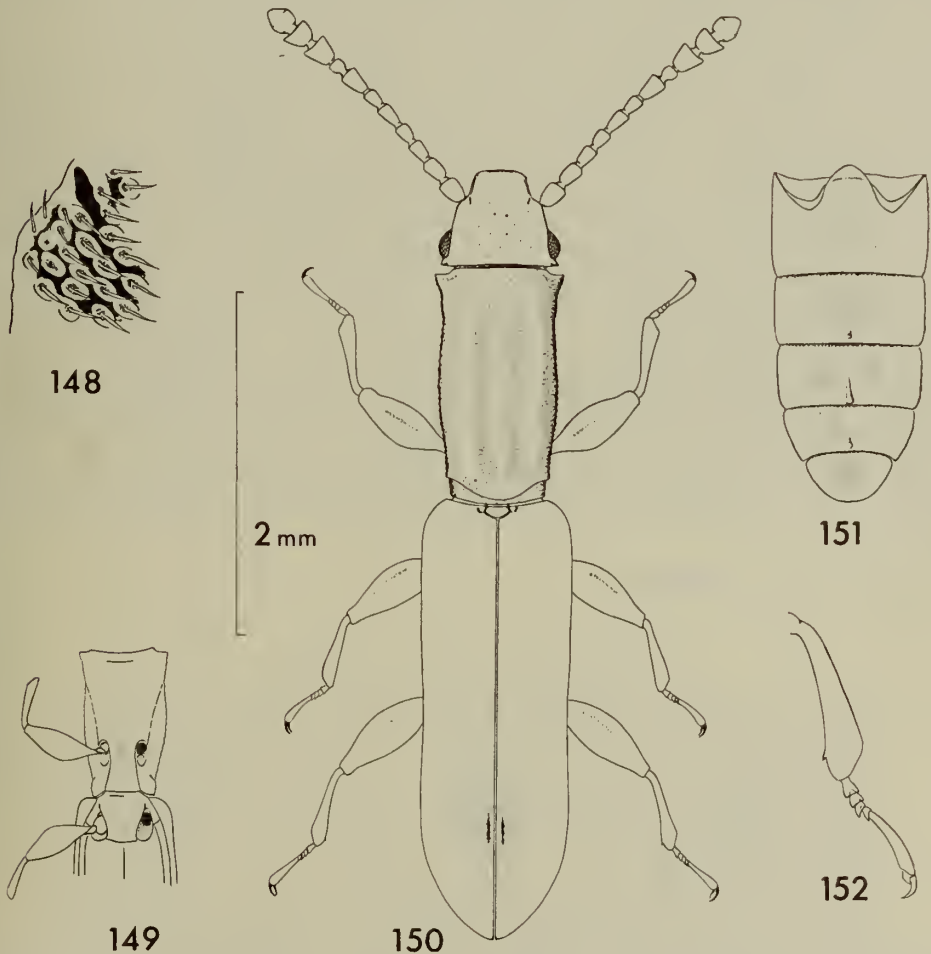
HABITATS. Found under bark of *Holotelea integrifolia* (India), on *Albizzia* log (Malaya), collected in a light trap (Singapore), and imported on Burmese ground-nut cake loaded at Rangoon.

PARASILVANUS Grouvelle **stat. n.**

Silvanus (Parasilvanus) Grouvelle, 1912 : 335. Type-species: *Silvanus ocellatus* Grouvelle, by PRESENT DESIGNATION.

Number of species: 6.

Length 2.49–4.81 mm; depressed, moderately to extremely elongate; yellowish brown to black with fine decumbent golden pubescence. *Head* transverse to elongate, rather sparsely to densely punctured on frontal triangle, puncturation ocellate, granulate or reticulate; clypeal margin slightly emarginate, with a fine ridge bordering side of clypeus and part of gena and a fovea at clypeogenal emargination (except in *fairmairei*); genae not strongly raised. *Antennae* (Text-figs 166–169, 176) 11-segmented, scape broader than segments 2–6, as broad as or broader than segment 7, segment 8 strongly differentiated from other segments, being much smaller;



FIGS 148–152. *Parasilvanus ocellatus* (Grouvelle). 148, Puncturation in region of clypeogenal emargination. 149, Pro- and meso-sternum. 150, Dorsal view of ♂. 151, Abdominal sternites of ♂. 152, Hind leg of ♂.

segments 9 and 10 broader than other flagellar segments and with apical segment forming a loose club, apical margins of club segments with inconspicuous spines. *Eye* small when compared with *Protosilvanus* and not very prominent; temples short (as long as 1.5 eye-facets in *mimosae*) to long (as long as 2-4 eye-facets in *fairmairei*). *Mouth parts*, labial palps with apical segment smaller than penultimate (Text-fig. 131); maxillary palps with segment 2 larger than apical segment (Text-fig. 132). *Thorax* with pronotum moderately to extremely elongate (2.5 times as long as broad), puncturation as on head; anterior margin almost straight to slightly emarginate medially, rim of foramen may be considerably in advance of anterior angles (e.g. *pulcher*); anterior angles small, obtuse or acute at apex, variable within species; side margins finely serrate; posterior angles ill-defined to distinct; posterior margin sometimes tending to be confluent with rim of foramen; sides steeply declivous from broad disc, which may be shallowly and broadly depressed on each side or bear deep longitudinal depressions (e.g. Text-figs 150 and 163). *Scutellum* transverse. *Prosternum* (Text-fig. 149) with sternopleural sutures and procoxal cavities as in *Silvanus*, prosternal process with a slight channel, at apex slightly broader than between coxae, in comparison with *Silvanus* only a little broader apically than mesosternal apex. *Metasternum* with median line more or less complete. *Legs* with tarsi as in *Silvanus*, secondary sexual characters exhibited by ♂ as follows: metatrochanter with tooth on inner apex (*mimosae* only); metatibia with lamellate tooth near apex (except in *oblitus*). *Elytra* with 9 rows of punctures forming striae - in *mimosae* a tenth stria present on basal third; all interstriae equally raised (*mimosae*) or with interstria 2 flat, then alternate interstriae raised, in some species 3 and 5 slightly, 7 and 9 forming distinct ridges (carinate), 9 only at base, setiferous punctures of interstriae and interspaces may be ocellate; in ♂ *tenuis*, *ocellatus*, *pulcher* sutural stria depressed near apical fourth for distance of 4 or 5 punctures and tip of elytra may be slightly flexed dorsally (characters ill-defined or absent in small specimens); elytra not explanate at sides; epipleura not quite as broad as in *Silvanus*, tapered to apex or just before apex. *Wing* as in *Silvanus*. *Metendosternite* without a stem. *First visible sternite of abdomen* 'sternite 1' with femoral lines closed; in ♂ sternite 3 may have a carinate process medially towards caudal margin (Text-fig. 151), 2 and 4 may have a microtubercle in same position and 4 a small carinate process; in small ♂♂ these processes are small or absent. *Genitalia*, ovipositor similar to *Silvanus*; aedeagus with median strut variable, similar to *mimosae* (Text-fig. 153) or broader (*fairmairei*), parameres truncate or rounded at apex, bearing from 2 to approximately 14 long setae, median lobe with apex produced (Text-figs 156-162), internal sac with complex chitinous structure as in *mimosae* (Text-fig. 154) or shorter, e.g. in *fairmairei* and *tenuis*; ♂ abdominal sternites 8 and 9 similar to Text-fig. 155.

DISTRIBUTION. Ethiopian.

KEY TO SPECIES OF *PARASILVANUS*

- 1 Head and pronotum punctate-reticulate (Text-fig. 178); elytra punctate-striate, all interstriae equally raised (Text-fig. 179); head and pronotum as in Text-figs 174, 175 *mimosae* sp. n. (p. 107)
- Head and pronotum not punctate-reticulate, either interspaces much broader or puncturation entirely different; elytra different; head and pronotum not as above 2
- 2 (1) Head appearing finely granulate due to densely reticulate interspaces, clypeus and frontal triangle with sparse puncturation (Text-fig. 170) different from that near eyes; without a fovea at clypeogenal emargination; 8th antennal segment as in Text-fig. 169; form of head and pronotum characteristic (Text-figs 172, 173) *fairmairei* (Grouvelle) (p. 100)
- Head not appearing finely granulate, puncturation of frontal triangle not obviously different from that of rest of head; with a fovea at clypeogenal

emargination; antennae as in Text-figs 166-168; pronotum moderately to extremely elongate

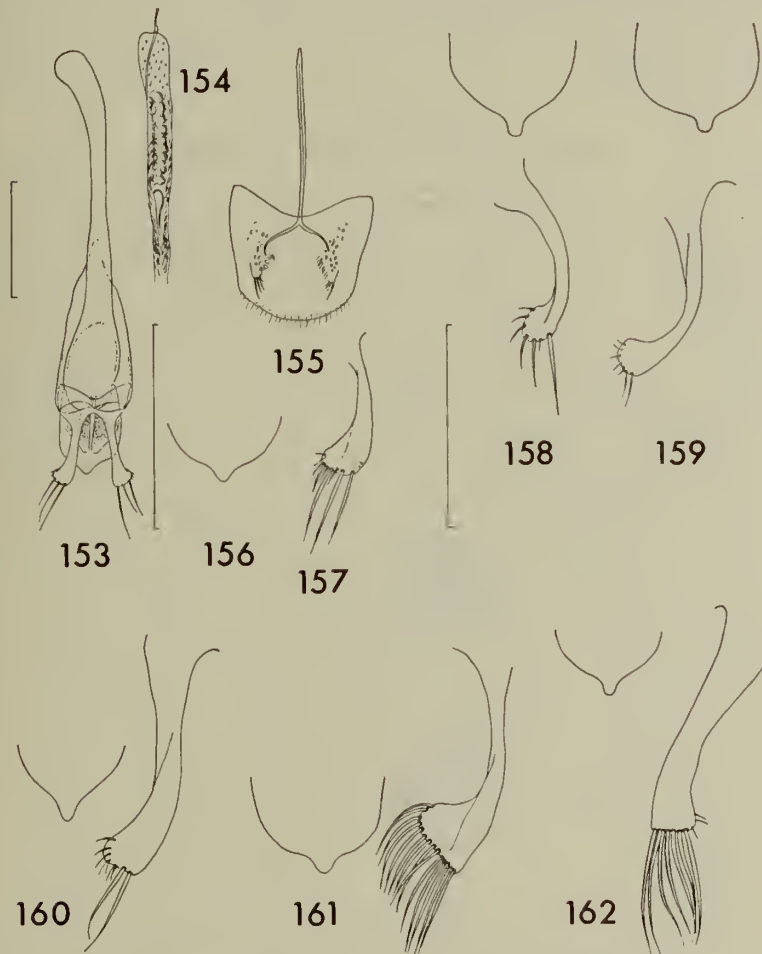
- 3 (2) Extremely elongate species; form of head and pronotum diagnostic, pronotum behind anterior angles, broadest at basal third (Text-fig. 163) 3

Length 3.42-4.81 mm *pulcher* (Grouvelle) (p. 102)

- Moderately elongate species; pronotum and head not as above, pronotum behind anterior angles, broadest at middle 4

- 4 (3) Vertex of head with deep, obvious coarse punctures and fine setiferous punctures with slightly raised margins (slightly ocellate) Text-fig. 171; head slightly longer than broad (10.4-11 : 10); pronotum elongate (18-19 : 10), disc without obvious foveae (slight depressions are present) Text-fig. 164

tenuis (Grouvelle) (p. 103)



FIGS 153-162. *Parasilvanus*, male genitalia. 153-157, *P. mimosae* sp. n. 154, Internal sac. 155, Sternites 8 and 9. 156, Apex of median lobe. 157, Paramere. 158-162, Apex of median lobe and paramere. 158, *P. fairmairei* (Grouvelle). 159, *P. tenuis* (Grouvelle). 160, *P. ocellatus* (Grouvelle). 161, *P. oblitus* (Grouvelle). 162, *P. pulcher* (Grouvelle). Scale lines = 0.2 mm.

- Vertex of head with ocellate setiferous punctures dominant, coarse punctures present but less obvious; pronotal length : breadth 15-19 : 10, disc with shallow to deep lateral foveae, if with shallow foveae then head broader than long (11-12 : 10) 5
- 5 (4) Pronotum more elongate (16-19 : 10) with deep lateral foveae on disc; head often appearing elongate, although broader than long (10.1-10.4 : 10), Text-fig. 150; metasternal disc with well-defined lateral depressions and comparatively impunctate regions of caudal half obvious (only fine setiferous punctures present), interspaces dull to moderately shining; in ♂, metatibia with a lamellate tooth towards apex (Text-fig. 152) and elytra with sutural stria depressed near apical fourth (Text-fig. 150) *ocellatus* (Grouvelle) (p. 104)
- Pronotum less elongate (15-16 : 10) with shallow ill-defined lateral depressions on disc; head more obviously broader than long (11-12 : 10), Text-fig. 165; metasternal disc without distinct lateral depressions hence impunctate regions (as above) ill-defined, interspaces shining; in ♂, sutural stria of elytra and metatibia simple *oblitus* (Grouvelle) (p. 105)

Parasilvanus fairmairei (Grouvelle)

(Text-figs 158, 169, 170, 172, 173)

Silvanus fairmairei Grouvelle, 1882 : 292. Type(s), ZANZIBAR [not seen].

? *Silvanus filum* Kraatz, 1895 : 162. Holotype, sex indet., TOGO [not seen, synonymy Grouvelle's (1912) suggestion].

Silvanus (Parasilvanus) fairmairei Grouvelle, 1912 : 335.

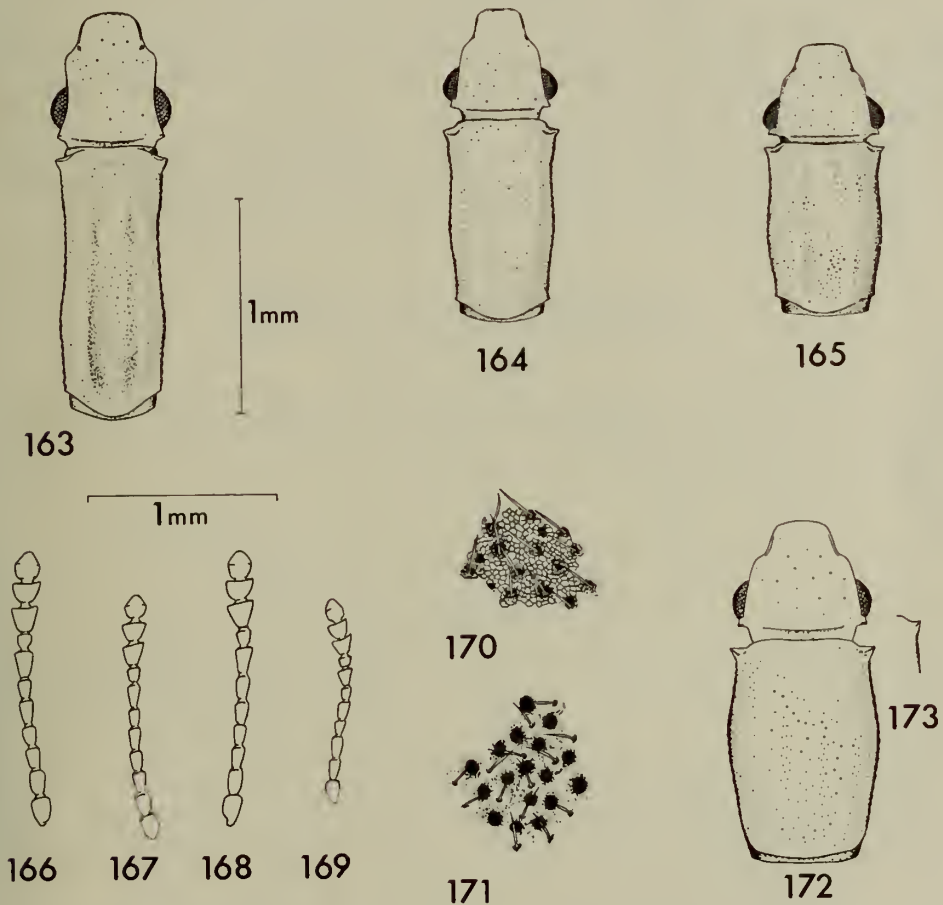
Length 3.08-4.14 mm. Black or brown. *Head* broader than long (12-13 : 10), clypeus and frontal triangle which extend to middle of vertex, sparsely punctured having setiferous punctures (diameter, one half to one third of eye-facet) separated by 2-4 diameters, rest of head with slightly rugose puncturation, everywhere interspaces strongly reticulate (Text-fig. 170), appearing finely granulate and dull except on clypeus where moderately shining; clypeus without a fovea at clypeogenal emargination; ventral puncturation similar to that on sides of vertex. *Antenna*. Text-fig. 169, slightly longer than pronotum (11 : 10) 8th segment slightly transverse. *Pronotum* 1.5-1.6 times as long as broad, breadth across anterior angles slightly greater than across eyes (10.6-10.7 : 10), Text-fig. 172; puncturation similar to that at sides of vertex (when viewed at certain angles may appear somewhat ocellate), interspaces strongly reticulate and dull; anterior angles variable - forms illustrated in Text-figs 172, 173; disc with broad shallow depressed areas each side of mid-line; basal margin not confluent with rim of foramen which is higher than it. *Thoracic sternites*. Prosternum with a distinct striga across apical ninth and some feeble transverse rugosity from apical one third to one ninth, punctures shallow and ill-defined, towards sides appearing granulate, interspaces strongly reticulate and dull; mesosternum and metasternum everywhere strongly reticulate and dull, bearing shallow punctures separated by 1-2 diameters, but becoming denser and larger towards base of mesosternum and sides of metasternum. *Elytra* 2.9-3.1 times as long as broad, general shape as in *ocellatus*, striae and interstriae as in *tenuis* but ♂ without a depression near apex and setiferous punctures sometimes ocellate. *Abdominal sternites*. Puncturation fairly dense, shallow setiferous punctures separated by less than half a diameter; in ♀ discs of sternites not depressed, in small ♂♂, discs of sternites similarly not depressed but with a tubercle medially near caudal margin on sternite 3; in large ♂♂, disc of sternite 1 almost flat, sternites 2-5 with disc depressed, sternite 3 with a carinate process and 4 with a micro-tubercle medially towards caudal margins. *Legs*. Metatibia in ♂ with a lamellate tooth near apex (as in *ocellatus*). *Genitalia* ♂, apex of median lobe and paramere, Text-fig. 158, median strut broad, more as in *Protosilvanus lateritius* - Text-fig. 134.

Number seen: 500+.

Although the types of *fairmairei* have not been located, a number of specimens determined by Grouvelle (in MNHN, Paris and MRAC, Tervuren) have been examined. Grouvelle (1912) thought that *Silvanus filum* Kraatz was probably a variety of *fairmairei*. The type of *filum* has not been found. Specimens in the Deutsches Entomologisches Institut labelled *filum* by Kessel are *fairmairei*.

COMPARATIVE NOTES. The puncturation of the head and the general facies of this species are distinctive.

DISTRIBUTION. Ethiopian, sometimes imported with timber (to Italy and Britain) and one record in association with stored products. MAURITANIA: Bafrechie



FIGS 163-173. *Parasilvanus*. 163, *P. pulcher* (Grouvelle) head and pronotum. 164, *P. tenuis* (Grouvelle) same. 165, *P. oblitus* (Grouvelle) same. 166-169, Antennae. 166, *P. ocellatus* (Grouvelle). 167, *P. tenuis*. 168, *P. oblitus*. 169, *P. fairmairei* (Grouvelle). 170-171, Puncturation on vertex. 170, *P. fairmairei*. 171, *P. tenuis*. 172-173, *P. fairmairei*. 172, Head and pronotum. 173, Variant of anterior angle of pronotum.

and Misserah; SENEGAL: Badoumbe and Linguere; SIERRA LEONE: Njala; GUINEA: Region Kindia and N'Zérékoré and Mt Nimba; LIBERIA: Voinjama; GHANA: widely distributed; TOGO: Bismarckburg; NIGERIA: Ile-Ife, Zaria, Kano, Oyo, Isheri and Ibadan; IVORY COAST: Tonkoui and 5 ml ESE of Touba; CAMEROUN: Japoma, Mabete, Victoria, N'Kongsamba, N'Goko, Abong-Mbong and YaDande; EQUATORIAL GUINEA: N'Kolentangan; ZAIRE: widely distributed (reference numbers of specimens collected in the Parc National de la Garamba (see p. 43) 928, 985, 1214, 2115, 2298, 2601, 3276, 3384, 3519, 3563, 3738, 3744, 3748, 3757, 3799, 3992, 4007); ANGOLA: Cazombo, Mabete, 10 ml NE of Sada Bandeira and 6 ml NW of Sta Comba Dao; UGANDA: Kampala, Jinja and Sasse Islands; TANZANIA: 15 mls S of Handeni and 14 mls S of Sumbawanga; KENYA: Tiwi and Gazi (Grouvelle, 1923); MOZAMBIQUE: Caia; ZAMBIA: Mwengwa and Shigariatombwes; RHODESIA: Salisbury and 2 ml NW of Sinola. In BMNH, London; CAS, California; IFAN, Dakar; IRSNB, Brussels; MNHN, Paris; MRAC, Tervuren; TM, Budapest and ZM, Berlin.

HABITATS. This species has been collected at light (Ghana, Nigeria and Zaire), under bark of dead trees and shrubs (*Ricinodendron*, *Canarium*, *Erythrophloeum*, *Chlorophora* etc.), in humus and alighting on fruits of *Ficus capensis*.

Parasilvanus pulcher (Grouvelle)

(Text-figs 162, 163)

Silvanus pulcher Grouvelle, 1905 : 255. LECTOTYPE ♀ (here designated, see below), EQUATORIAL GUINEA (Instituto Español de Entomología, Madrid) [examined].

Silvanus (Parasilvanus) pulcher Grouvelle, 1919 : 206.

Length 3.42-4.81. Large specimens extremely elongate. *Head.* Form characteristic (Text-fig. 163), longer than broad (comparatively longer in largest specimens) 11-13 : 10, with coarse deep punctures (diameter, equal to or less than eye-facet) and on interspaces ocellate setiferous punctures (diameter, one half to one third of coarse punctures), interspaces reticulate and moderately shining; clypeus with a fovea at clypeogenal emargination; ventral surface with coarse deep punctures, and fine setiferous punctures on narrow, shining interspaces (setiferous punctures may be somewhat ocellate), reticulation feeble. *Antennae* similar to *tenuis*, longer than prothorax (13-14 : 10). *Pronotum* 2.2-2.5 times as long as broad, breadth across anterior angles slightly to distinctly less than across eyes (10 : 10.6-11.7), behind anterior angles narrowest at apical third and broadest at basal third (Text-fig. 163); puncturation similar to that on head; anterior angles distinctly lateral; disc with longitudinal depressions as in *ocellatus*; basal margin higher than rim of foramen, not confluent with it. *Thoracic sternites.* Prosternum with slight transverse rugosity towards apical ninth, pro- and mesosternal puncturation rather rugose, coarse punctures (twice eye-facet diameter) and fine setiferous punctures on interspaces, some, particularly on prosternal process, appearing slightly ocellate, interspaces narrow strongly reticulate and dull; metasternum as in *ocellatus*. *Elytra* 2.6-3.1 times as long as broad, general facies as in *ocellatus*, ♂ with an elongate fovea on sutural stria and elytra slightly flexed dorsally at apex, both characters ill-defined or absent in very small specimens, ♀ simple. *Abdominal sternites* with coarse punctures separated by 1-2 diameters on disc and becoming larger and denser towards sides, interspaces with fine setiferous punctures; in ♀♀, discs of sternites not depressed and without tubercles, in small ♂♂, disc of sternite 1 flat, extremely feeble depressions on sternites 2-4, sternite 5 depressed; in large ♂♂, deeper depressions, particularly deep on sternite 2; ♂ sternite 3 with a carinate tubercle medially

near caudal margin (as in *ocellatus*, Text-fig. 151) and sternites 2 and 4 with hardly discernible micro-tubercles in the same position. *Metatibia* in ♂ with a lamellate tooth. *Genitalia* ♂, apex of median lobe and paramere, Text-fig. 162.

Number seen: 37.

Grouvelle described this species twice (Grouvelle, 1905 and 1919). In the paper containing the original description (Grouvelle, 1905) he states 'Les insectes objet de ce Mémoire provenant sans exception de Biafra - Cabo San Juan, et ayant été recueillis par M. Martinez de la Escalera . . .' and thus only specimens bearing this locality data can be considered as types. There are two specimens in the MNHN, Paris, from Cameroun (*Kraatz*) labelled 'Type [ptg] *Silvanus pulcher* Grouv [Grouvelle's MS]' but these obviously cannot be types.

Grouvelle gave no indication of the number of specimens on which he based his original description.

Lectotype, present designation, ♀, length 3.5 mm, with 'Biafra Cabo S. Juan VII-1901 Escalera [ptg.]/19/*Silvanus pulcher* Grouv [Grouvelle's MS]', in Instituto Español de Entomología, Madrid.

COMPARATIVE NOTES. Closely related to *ocellatus* but the shape of the head and pronotum is diagnostic.

DISTRIBUTION. Ethiopian. GHANA: Bobiri forest res., and Kumasi; CAMEROUN: Joh-Albrechtshöhe and Mabete; EQUATORIAL GUINEA (type-locality): Fernando Po Is (in Instituto Español de Entomología, Madrid) and Makomo Campogbt; GABON; ZAIRE: Haut-Vele, Bas-Vele, Equateur, Kasal, Jadolville and 39 km S of Walikale; CONGO: Brazzaville. In BMNH, London; CAS, California; MNHN, Paris; MRAC, Tervuren; TM, Budapest and ZM, Berlin.

HABITATS. In Ghana it has been collected on dead and fallen trees and at light.

Parasilvanus tenuis (Grouvelle)

(Text-figs 159, 164, 167, 171.)

Silvanus tenuis Grouvelle, 1889 : 105. LECTOTYPE ♂ (here designated, see below), IVORY COAST (MNHN, Paris) [examined].

Silvanus (Parasilvanus) tenuis Grouvelle, 1912 : 335.

Length 2.97-3.91 mm. *Head* slightly longer than broad (10.4-11 : 10), vertex with coarse, deep punctures as broad as an eye-facet, in general separated by less than a diameter, interspaces shining and bearing fine setiferous punctures which have slightly raised margins (some-what ocellate) Text-fig. 171; clypeus with a small deep fovea at clypeogenal emargination; ventral puncturation similar to that on vertex. *Antennae* (Text-fig. 167) longer than pronotum (13 : 10) 8th segment a little longer than broad (11 : 10). *Pronotum*. Almost twice as long as broad (18-19 : 10), breadth across anterior angles equal to that across eyes; puncturation as on vertex; form as in Text-fig. 164, disc nearly flat (extremely shallow, ill-defined depressions each side of mid-line); basal margin not confluent with rim of foramen. *Thoracic sternites*. Pro- and mesosternal puncturation as on ventral region of head, interspaces shining and with ill-defined reticulation, prosternum with feeble transverse rugosity towards apex (as in *ocellatus*); metasternum with broad, shallow, punctate depressions each side of caudal half of median line, which is situated in a narrow shining impunctate region (breadth of 2-3 coarse punctures).

Elytra 2.7-2.8 times as long as broad, sides subparallel to apical fourth, then moderately convergent, finally rounded to apex; punctate-striate, stria punctures coarse and deep, separated longitudinally by half diameter or less; ♂ sutural stria depressed near apical fourth for distance of 4-5 punctures; interstriae and sides of stria interspaces bearing fine setiferous punctures; interstria 2 flat (interstria 1 = sutural interstria) then alternate interstriae raised, interstriae 3 and 5 slightly raised, 7 and 9 forming low ridges, 7 for greater part of length, 9 basally. *Abdominal sternites*. Puncturation similar to thoracic sternites but less dense on sternites 2-5 and interspaces more obviously reticulate, shining; in ♀♀, discs of sternites flat; in ♂♂, discs of sternites 2-5 slightly depressed (in large ♂♂ sternite 4 with deepest depression), sternite 2 with a micro-tubercle medially near caudal margin and, in a similar position, on sternite 3 a carinate tubercle. *Legs*. Metatibia of ♂ with a lamellate tooth towards apex (as illustrated in Text-fig. 152). *Genitalia* ♂, apex of median lobe and paramere, Text-fig. 159.

Number seen: 14.

Lectotype, present designation, ♂, length 3.47 mm, with 'Assinie Afrique oc [green label ptg.]/Type/Type [pink and white labels ptg.]/*Silvanus tenuis* Grouv [MS]/*S. tenuis* ty. Grouv [Grouvelle's MS]'. Grouvelle (1889) gave no indication of the number of specimens on which he based his description but in a later paper (Grouvelle, 1892) he described *tenuis* thus 'Assinie, commun' and therefore, although I have found only one specimen (in MNHN, Paris) labelled 'Type', I have chosen to designate it as a lectotype.

COMPARATIVE NOTES. The elongate pronotum without distinct longitudinal depressions on the disc (slight depressions are present) and the puncturation of head and pronotum distinguish this species from the closely related *ocellatus* and *pulcher*.

DISTRIBUTION. Ethiopian. SIERRA LEONE: Njala (BMNH, London); IVORY COAST: Lectotype and 9 ex. Tonkouli (IFAN, Dakar) NIGERIA: Ile-Ife (PICL, Slough); CAMEROUN: Matute (CAS, California); EQUATORIAL GUINEA (Grouvelle, 1905, 1919, specimens not seen); ZAIRE: Beni Ituri forest from flower spike of palm (BMNH, London) Equateur Flandria (MRAC, Tervuren).

Parasilvanus ocellatus (Grouvelle)

(Text-figs 148-152, 160, 166)

Silvanus ocellatus Grouvelle, 1889 : 104. LECTOTYPE ♂ (here designated, see below), IVORY COAST (MNHN, Paris) [examined].

Silvanus (Parasilvanus) ocellatus Grouvelle, 1912 : 335.

Length 3.31-4.03 mm. *Head* about as broad as long (10.1-10.4 : 10) with ocellate setiferous punctures (coarser punctures, e.g. as in *tenuis*, ill-defined) punctures on vertex having diameter (including margin) equal to an eye-facet and separated by a diameter, or less, interspaces dull, only margins of punctures shining; clypeus with a small fovea at clypeogenal emargination (Text-fig. 148); ventral surface with ocellate punctures as on vertex and coarse punctures mostly reduced to crescents. *Antennae* longer than pronotum, longest in large specimens (11-13 : 10), 8th segment almost quadrate, Text-fig. 166. *Pronotum* 1.6-1.9 times as long as broad, breadth across anterior angles equal to, or greater than across eyes (11 : 10); puncturation as on vertex but less dense, punctures separated by 1-2.5 diameters; shape as in Text-fig. 150 or sometimes with sides more convergent from middle to base; disc with two moderately strong, longitudinal depressions which are deepest medially and remain fairly distinct basally; basal margin not confluent with rim of foramen. *Thoracic sternites*. Prosternum with coarse

puncturation (laterally punctures with diameter twice that of eye-facet) and ocellate setiferous punctures on strongly reticulate, dull to moderately shining interspaces, at apical ninth some punctures laterally confluent, producing feeble transverse rugosity; metasternal disc with distinct shallow lateral foveae bearing coarse punctures and ocellate setiferous punctures, comparatively impunctate at sides for caudal half or two-thirds and along median line (only setiferous punctures present), interspaces everywhere strongly reticulate and dull to moderately shining. *Elytra* 2.7-3.0 times as long as broad, shape as in Text-fig. 150; alternate interstriae (3, 5, 7 and 9) more or less equally raised, striae as in *tenuis* (for ♂ see Text-fig. 150). *Abdominal sternites* with coarse punctures (rather ill-defined laterally in some specimens) and somewhat ocellate setiferous punctures; in ♀♀, discs of sternites simple, in ♂♂ (Text-fig. 151) discs depressed, depressions deepest in largest specimens, sternite 2 with strongest depression, 5 more or less concave; sternite 3 with a distinct carinate process, in *large* ♂♂ sternite 2 with a micro-tubercle and 4 with a small carinate process, in *small* ♂♂ these two sternites bearing ill-defined process. *Legs*. Metatibia in ♂ (Text-fig. 152) with a lamellate tooth towards apex. *Genitalia* ♂, apex of median lobe and paramere, Text-fig. 160.

Number seen: 200.

Lectotype, present designation, ♂, length 3.9 mm, with 'Assinie Côte occid Afrique Ch. Alluaud 1886/Type [both labels ptg.]/S. ocellatus Grouv ty. [Grouvelle's MS]'. Paralectotypes, 2 ♂, one with same locality label as lectotype, the other with 'Abyssinie Raffray [MS]/Type [ptg.]/ocellatus Grouv.'. All in MNHN, Paris.

COMPARATIVE NOTES. This species might be confused with the closely related *oblitus* or *tenuis*. The dominant ocellate puncturation of head and pronotum and the strong longitudinal depressions on the pronotum distinguish *ocellatus* from *tenuis*. See comparative notes under *oblitus* for distinguishing characters.

DISTRIBUTION: Ethiopian. SENEGAL: Mbaio; GUINEA: Mt Nimba, Region Kindia and N'Zérékoré; IVORY COAST: (syntypes) and Tonkoui; SIERRA LEONE: Njala; TOGO: Bismarckburg; GHANA: Mpraeso; DAHOMEY: Mt Togo nr Klouto; NIGERIA: Abeokouta and Ile-Ife; CENTRAL AFRICAN REPUBLIC: Fort Crampeli; EQUATORIAL GUINEA: Nkolentangan and Uellenburg; ZAIRE: widely distributed (reference numbers of specimens collected in the Parc National de la Garamba (see p. 43) 985, 1281, 2315, 3082, 3115, 3384, 3649, 3774, 3823, 4007); ANGOLA: Cubal, Dundo and Mabete; ETHIOPIA: (syntypes) and nr Nazareth; UGANDA: Busalamu, Kampala, Maragambo Forest, nr Jinja and Ruwenzori Range, Semliki Forest, 2,850 ft; KENYA: Kaimosi Mission NE of Kisumu; TANZANIA: Lake Manyara and nr Sumbawanga. In BMNH, London; CAS, California; IFAN, Dakar; IRSNB, Brussels; MD, Dundo; MF, Munich; MNHN, Paris, MRAC, Tervuren; TM, Budapest and ZM, Berlin.

HABITATS. In the field this species has been found under bark of dead trees (*Voacanga obtusa*, *Spondianthus preussi*, *Cedrella* and *Hevea*) and at light. It has been found on stored products on one occasion and a specimen was collected in a British timber-yard on an African mahogany log.

Parasilvanus oblitus (Grouvelle)

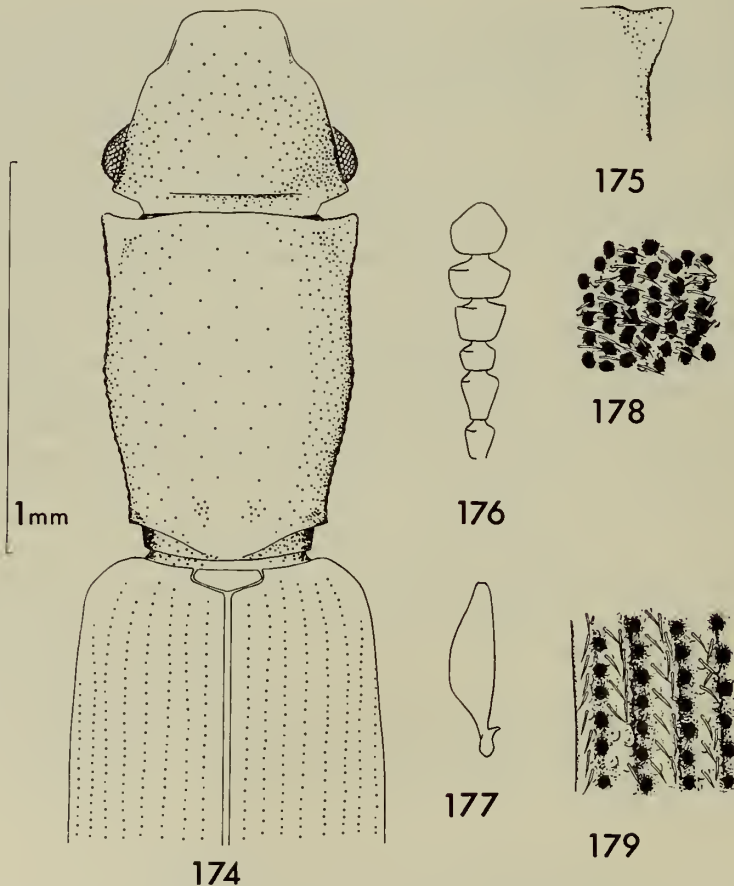
(Text-figs 161, 165, 168)

Silvanus oblitus Grouvelle, 1909 : 116. Holotype ♀, TANZANIA (MNHM, Paris) [examined].

Silvanus (*Parasilvanus*) *oblitus* Grouvelle, 1912 : 335.

Silvanus apicalis Grouvelle, 1923 : 266. LECTOTYPE ♂ (here designated, see below), KENYA (MNHN, Paris) [examined]. **Syn. n.**

Length 3.25–4.15 mm. *Head* broader than long (11–12 : 10); puncturation variable, ocellate setiferous punctures on interspaces of coarser punctures, the latter slightly broader than an eye-facet and in some regions becoming ill-defined, diameter of ocellate puncture, including rim, equal to half that of coarse puncture; interspaces dull when compared with shining margins of ocellate punctures; clypeus with a small fovea at clypeogenal emargination; ventral puncturation coarse and dense, most of punctures larger than eye-facets, interspaces with fine setiferous punctures, shining. *Antennae* (Text-fig. 168) longer than pronotum (14 : 10), segments slightly more elongate in largest specimens, 8th segment as long as, or slightly longer than broad. *Pronotum* (Text-fig. 165) 1.5–1.6 times as long as broad, breadth across anterior angles greater than across eyes (11 : 10); puncturation similar to vertex; disc with two shallow ill-defined longitudinal depressed areas which merge and become diffuse basally; basal margin not confluent with rim of foramen. *Thoracic sternites* with dense coarse puncturation, largest punctures



FIGS 174–179. *Pavasilvanus mimosae* sp. n. 174, Head, pronotum and base of elytra. 175, Variant of anterior angle of pronotum. 176, Antennal segments 6–11. 177, Metatrochanter and femur of ♂. 178, Puncturation of pronotum. 179, Puncturation of elytra (small area including sutural margin).

twice as broad as an eye-facet, very fine setiferous punctures on shining interspaces; prosternum with transverse feeble rugosity towards apex (as in *ocellatus*); metasternal disc depressed, shining, reticulation ill-defined to distinct, sparsely punctured with fine setiferous punctures and coarse punctures, without distinct lateral depressions although lateral and median regions without coarse punctures. *Elytra* 2.8 times as long as broad; similar to *tenuis* but ♂ elytra without a short depressed area on sutural stria. *Abdominal sternites* with puncturation coarse and rather shallow, particularly on sternites 1 and 2, punctures becoming larger laterally where separated by less than diameter, medially separated by 1-2 diameters; interspaces with extremely fine punctures (non ocellate), reticulation ill- to well-defined; in ♀♀ discs of sternites not depressed, in ♂♂ disc of sternite 1 flat, 2 slightly to strongly (large specimen) depressed and with a small more or less distinct tubercle medially near caudal margin, 3 slightly depressed, bearing a prominent carinate process in the same position, 4 also slightly depressed and with a tubercle as in 2, 5 whole sternite concave. *Legs*. Tibia simple in both sexes. *Genitalia* ♂, apex of median lobe and paramere, Text-fig. 161.

Number seen: 23.

Holotype ♀, length 3.42 mm, with 'Af. or All Dar es Salaam [MS]/Eichelbaum [MS]/Type [MS violet ink]/12q/Type [pink label ptg.]/S. oblitus ty Grouv [green label Grouvelle's MS]'. In MNHN, Paris; unique.

There are four syntypes of *S. apicalis* Grouvelle in MNHN, Paris, with data as given in the original description.

Lectotype, present designation, ♂, length 3.47 mm, with 'AFR. OR. ANGL (KIKUYU-ESCT) KIJABE ALLUAUD ET JEANNEL Dec 1911- 2100 m - St 27./Type [pink label ptg.]/apicalis Grouv [green label Grouvelle's MS]'. Paralectotypes, one with locality label as lectotype, others with 'Afrique orient. anglaise FORET DE NAIROBI ALLUAUD & JEANNEL Nov.-Dec. 1911 - 1700 m - St 28./Type [pink label ptg.]/*Silvanus apicalis* Grouv [Grouvelle's MS]'

COMPARATIVE NOTES. The comparatively short pronotum with shallow longitudinal depressions which merge basally, the shining metasternum bearing a few coarse punctures, the more transverse head with less elongate clypeogenal foveae and the parameres distinguish this species from the very closely related *ocellatus*.

DISTRIBUTION: Ethiopian. ZAIRE: Ituri; ANGOLA: Cuito, 14 ml SE of Hengue and nr source of R. Tchimboma; SUDAN: Didinga Distr.; KENYA: Kitale, Kijabe, Nairobi and Ambony River (Grouvelle, 1923 *oblitus* and *apicalis*); TANZANIA: Dar es Salaam (holotype); RHODESIA: Mashonaland; SOUTH AFRICA: St Lucia, Malvern and Pretoria. In BMNH, London; CAS, California; MNHN, Paris and MRAC, Tervuren.

HABITATS. It has been found with *Lyctus brunneus* (Pretoria) and collected on *Cedrella* (Ituri) and under bark of *Eucalyptus* etc. (Angola).

Parasilvanus mimosae sp. n.

(Text-figs 153-157, 174-179)

Length 2.49-3.39 mm. Puncturation of head, prothorax and elytra similar (Text-figs 178, 179). General appearance rather dull. The Ghanaian specimens are rather atypical, having broader heads, shorter thorax and short elytra, ratios for these are given in square brackets. *Head* broader than long (11.3-11.9 : 10) [12.1-12.8 : 10] punctate-reticulate, having

regular deep, dense, coarse puncturation (breadth of puncture equivalent to twice an eye-facet) producing a strong reticulation, interspaces narrow, moderately shining and with fine setiferous punctures (reticulation (micro) of interspaces ill-defined); clypeus with a small fovea at clypeogenal emargination; vertex moderately to strongly raised. *Antennae* (Text-fig. 176), much longer than pronotum (14.5-14.3 : 10) 8th segment transverse. *Pronotum* times 1.38-1.49 [times 1.25-1.33] as long as broad, breadth across anterior angles slightly greater than across eyes (10.7-10.1 : 10); development of anterior angles variable (Figs 174, 175); disc without distinct longitudinal depressions, extremely feebly depressed towards base; medially basal margin almost confluent with rim of foramen. *Metasternum* slightly depressed in the middle of caudal half. *Elytra* 2.4-2.64[2.39-2.5] times as long as broad, striate (Text-fig. 179) and dull; stria punctures coarse and deep, separated longitudinally by one-third diameter or less; interstriae broader than stria punctures; all equally raised, forming rounded ridges and giving the elytra a striate appearance; interstriae bearing fine setiferous punctures. *Abdominal sternites*. Discs of sternites in both sexes without obvious depressions; in ♂♂ discs of sternites 1 and 2 may be extremely feebly depressed, sternite 3 in large ♂♂ with a small median tubercle towards caudal margin, in small ♂♂ this is ill-defined. *Legs*. In ♀ simple. Tibia in ♂ simple but metatrochanter with a tooth on inner apex (Text-fig. 177). *Genitalia* ♂, Text-figs 153-157 (155, sternites 8 and 9).

Holotype ♂, length 2.97 mm, ETHIOPIA: Djem-Djem Forest, circa 8,000 ft, Box 28, 25-29.ix.1926 (*Dr H. Scott*) (BMNH, London).

Paratypes (47). 23 ex. with same data as holotype; 2 ex., Djem-Djem Forest, nearly 9,000 ft. under bark of decaying *Mimosa*, Box 31 (*Dr H. Scott*) (these and the previous 23 ex. in BMNH, London); 6 ex., KENYA: Meru, vii. [19]43 (*van Someren*) (BMNH, London); 2 ex., Kaimosi Mission, 27 ml N.E. of Kisumu, 29.xi.57 (*E. S. Ross and R. E. Leech*); TANZANIA: 1 ex., Mount Meru, 1700 m, 28.x.57 (*E. S. Ross and R. E. Leech*) (this and the previous 2 ex. in CAS, California); 1 ex., ZAIRE: Kivu, Butembo, 200 m, 19.xii.1952 (*P. Basilewsky*); 1 ex., Haut Vele, Moto, 1920 (*L. Burgeon*); 2 ex., Mombassa (36 km S. Lubero), viii. 1932 (*L. Burgeon*) (specimens in MRAC, Tervuren); 1 ex., Lwiro River, 47 km N. Bukavu, 1950 m, 27.viii.57 (*E. S. Ross and R. E. Leech*), 4 ex., 9 ml. S of Lubero, 2150 m, 23.ix.1957 (*E. S. Ross and R. E. Leech*) (specimens in CAS, California); GHANA: 1 ex., Ashanti region, Bobiri forest reserve, 320 m, N 6.40 - W 1.15, No. 77, 10.x.1965 (*Dr S. Endrody-Younga*), and three specimens with same data but No. 85, 17.x.1965 (2 ex.) and No. 141, 27.iii.1966 (all in TM, Budapest).

COMPARATIVE NOTES. The general facies, punctate-reticulate head and prothorax and striate elytra readily distinguish this species.

DISTRIBUTION. Ethiopian. Ghana, Zaire, Ethiopia, Kenya and Tanzania.

HABITATS. Ghanaian specimens were collected on moribund tall trees and those from Ethiopia under bark of decaying *Mimosa*.

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